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DOE/ID-10586 December 22, 1997

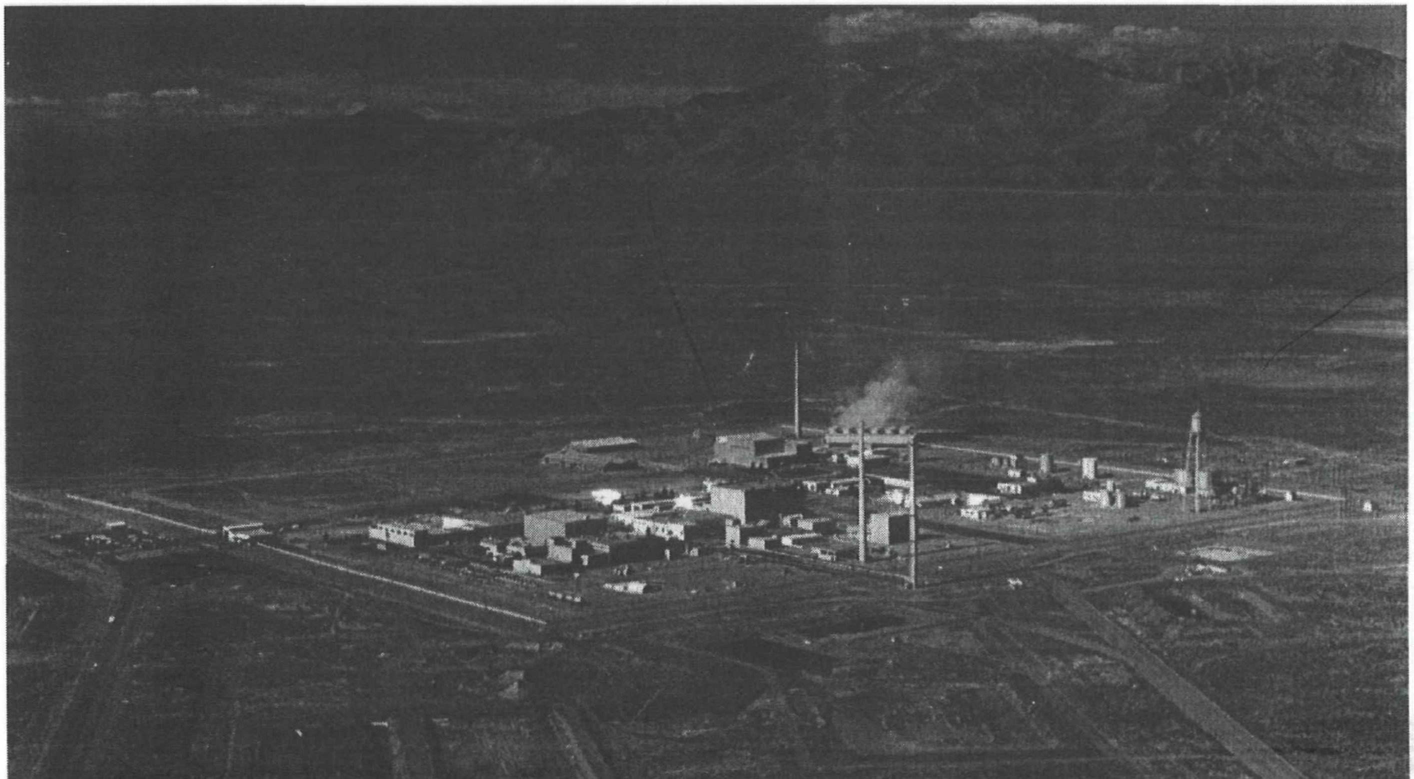
Idaho National Engineering Laboratory

IDAHO DEPARTMENT OF HEALTH AND WELFARE

DIVISION OF ENVIRONMENTAL QUALITY

Final Record of Decision

Test Reactor Area



Operable Unit 2-13
Idaho National Engineering and Environmental Laboratory
Idaho Falls, Idaho

DOE/ID-10586

Record of Decision
Test Reactor Area

December 22, 1997

Operable Unit 2-13
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Idaho Falls, Idaho

DECLARATION OF THE RECORD OF DECISION

Site Name and Location

Test Reactor Area, Waste Area Group 2
Operable Unit 2-13
Idaho National Engineering and Environmental Laboratory
Idaho Falls, Idaho

Statement of Basis and Purpose

The Test Reactor Area (TRA) Waste Area Group (WAG) 2 is one of the ten Idaho National Engineering and Environmental Laboratory (INEEL) WAGs identified in the Federal Facilities Agreement and Consent Order (FFA/CO) by the U.S. Environmental Protection Agency (EPA) Region 10, the Idaho Department of Health and Welfare (IDHW), and the U.S. Department of Energy (DOE). Operable Unit (OU) 2-13 is listed as the "WAG 2 Comprehensive Remedial Investigation (RI)/Feasibility Study (FS), including TRA Chemical Waste Pond" in the FFA/CO. The RI/FS task was to assemble the investigations previously conducted for WAG 2, to thoroughly investigate the sites not previously evaluated, and to determine the overall risk posed by the WAG. This resulting comprehensive Record of Decision (ROD) document presents the selected remedial actions for eight contaminant release sites at the TRA of the INEEL, Idaho Falls, Idaho. It provides information to support remedial actions for these eight sites where contamination presents an unacceptable risk, and a "No Action" decision on 47 additional sites at the TRA. These remedial actions have been chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1986, as amended by the Superfund Amendments and Reauthorization Act, and to the extent practicable, with the National Oil and Hazardous Substances Pollution Contingency Plan. It is also designed to satisfy the requirements of the FFA/CO. This decision is based on the administrative record for the site.

The DOE is the lead agency for this decision. The EPA and the IDHW have participated in the evaluation of the final action alternatives. The EPA and IDHW both concur with the selection of the preferred remedy for the TRA eight sites of concern and with the No Action determinations for the remaining sites.

Assessment of the Site

Eight of the 55 identified release sites within TRA have actual or threatened releases of hazardous substances, which, if not addressed by implementing the response actions selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment. These sites include four disposal ponds [Warm Waste Pond—1952, 1957, and 1964 cells (TRA-03), Chemical Waste Pond (TRA-06), Cold Waste Pond (TRA-08), and the Sewage Leach Pond (TRA-13)], three subsurface contaminant release sites [soil surrounding Hot Waste Tanks at Building 613 (TRA-15), Tanks 1 and 2 at Building 630 [(TRA-19), and the Brass Cap Area], and one area of surficial windblown contamination (Sewage Leach Pond Berms and Soil Contamination Area). The response actions selected in this ROD are designed to reduce the potential threats to human health and the environment to acceptable levels. The remaining 47 sites as part of the following OUs either were determined not to present an unacceptable risk to human health or the environment, and therefore require no further action, or were part of a previous ROD. These OUs are: Rubble Piles (no OU specified), Paint Shop Ditch (OU 2-01); Inactive Fuel Tanks (OU 2-02); Miscellaneous Spill Sites (OU 2-03); Petroleum and Polychlorinated Biphenyl Sites and the North Storage Area including the North Storage Area, Soil Contamination Area (OU 2-04); Hot Waste Tanks (OU 2-05); Rubble Sites (OU 2-06); Cooling Tower Sites (OU 2-07); Materials Test Reactor Canal (OU 2-08); Sewage Treatment Plant (OU 2-09); Retention Basin, Injection Well, Cold Waste Sampling Pit and Sump (OU 2-11); Perched Water (OU 2-12); and Hot Tree Site, Engineering Test Reactor Stack, French Drain Associated with TRA-653 and Diesel Unloading Pit (OU 2-13).

Description of the Selected Remedies

The selected remedy for the Warm Waste Pond (TRA-03), 1952 and 1957 cells, is containment of the pond contents using an engineered cover consisting of several layers of geologic materials to reduce potential exposure to contaminated pond sediments by human and environmental receptors. This remedy also includes the following institutional controls that are assumed to remain in effect for at least 100 years: long-term environmental monitoring, soil cover integrity monitoring and maintenance, surface water diversions, and access restrictions (e.g., fencing and signage). Before cover construction, the Warm Waste Pond 1957 cell may be filled to grade with bulk CERCLA-contaminated soils from the INEEL. For the Warm Waste Pond 1964 cell, where an interim remedial action was previously completed, a riprap or cobble gravel layer will be placed over the existing native soil cover to inhibit future intrusion or excavation and to increase the degree of permanence of the remedy. In addition, institutional controls as described above will be implemented for the Warm Waste Pond 1964 cell.

The major components of the selected remedy for the Warm Waste Pond are:

- Containment by cover, with an engineered cover constructed primarily of native materials

- Implementation may include consolidation of INEEL CERCLA-generated contaminated materials similar to those already in the Warm Waste Pond for containment under the 1957 cell engineered cover

- Implementation will include consolidation of clean native soil from an appropriate borrow source located at the INEEL

- Contouring and grading of surrounding terrain to direct surface water runoff away from the covers

- Periodic aboveground radiological surveys following completion of the covers to assess the effectiveness of the remedial action

- Periodic inspection and maintenance following completion of the covers to ensure cover integrity and surface drainage away from the covers

- Access restrictions consisting of fences, posted signs, and permanent markers

- Restrictions limiting land use for at least 100 years following completion of the covers

- Review of the remedy no less than every 5 years until determined by the regulatory agencies to be unnecessary.

The selected remedy addresses the principal risks posed by the Warm Waste Pond by providing shielding from ionizing radiation, a cover to inhibit ecological and human intrusion, and a long-lasting cover to diminish the effects of wind and water erosion.

The selected remedy of the Chemical Waste Pond (TRA-06) is containment with a native soil cover and institutional controls with possible excavation, treatment, and disposal after sampling. This remedy will provide a sufficient thickness of soil to effectively reduce the potential for human and/or biological intrusion or excavation into the contamination.

The EPA's preference for sites that pose relatively low long-term threats or where treatment is impractical (e.g., TRA radionuclide contamination) is engineering controls, such as containment. In the case of low-level mercury contamination in the Chemical Waste Pond, containment is a protective and cost-effective option to remediate the exposure pathway (homegrown food crop ingestion) determined to pose an unacceptable risk. Based on sampling to be conducted during the remedial design phase to determine the nature and extent of contamination, remediation of the Chemical Waste Pond may include excavation, treatment, and disposal prior to containment with a native soil cover.

A revised cost comparison based on the above-identified sampling will be reviewed by the agencies during the Remedial Design Phase.

The major components of the selected remedy for the Chemical Waste Pond are:

- Containment with a soil cover constructed primarily of native materials

- Implementation will include consolidation of clean native soil from the berms surrounding the Chemical Waste Pond and from an appropriate borrow source located at the INEEL

- Contouring and grading of surrounding terrain to direct surface water runoff away from the cover

- Final cover layer materials will be determined in the Remedial Design/Remedial Action Work Plan but may include a vegetated crested wheatgrass and a gravel mulch layer

- Periodic inspection and maintenance following completion of the cover to ensure integrity and surface drainage away from the cover

- Access restrictions consisting of fences, posted signs, and permanent markers

- Restrictions limiting land use for at least 100 years following completion of the cover

- Review of the remedy no less than every 5 years until determined by the regulatory agencies to be unnecessary.

The selected remedy addresses the principal risks posed by the Chemical Waste Pond by isolating the contaminants, providing institutional controls to inhibit human intrusion, and a long-lasting cover to inhibit the effects of wind and water erosion.

The selected remedy for the Sewage Leach Pond is containment using a native soil cover and institutional controls as described above. This remedy will provide a sufficient thickness of soil to effectively reduce the potential for intrusion or excavation into the contaminated area and will provide shielding against exposure to radionuclide contamination. Prior to placement of the final clean soil cover, contaminated soil will be removed from the sewage leach pond berms for placement in the bottom of the Sewage Leach Pond. The berms of the pond will then be placed into the pond to ensure that any contaminated soil is contained. Additional fill material will be used, as needed, to bring the ponds to grade.

The major components of the selected remedy for the Sewage Leach Pond are:

- Containment by capping with a native soil cover constructed primarily of native materials
- Contaminated soil from the berms will be placed in the bottom of the Sewage Leach Pond cells
- Implementation will include consolidation of soil from the berms surrounding the Sewage Leach Pond and from an appropriate borrow source located at the INEEL
- Contouring and grading of surrounding terrain to direct surface water runoff away from the cover
- Final cover layer materials will be determined in the Remedial Design/Remedial Action Work Plan but may include a vegetated crested wheatgrass and a gravel mulch layer
- Periodic aboveground radiological surveys following completion of the cover to assess the effectiveness of the remedial action
- Periodic inspection and maintenance following completion of the cover to ensure cover integrity and surface drainage away from the cover
- Access restrictions consisting of fences, posted signs, and permanent markers
- Restrictions limiting land use for at least 100 years following completion of the cover
- Review of the remedy no less than every 5 years until determined by the regulatory agencies to be unnecessary.

The selected remedy addresses the principal risks posed by the Sewage Leach Pond by providing shielding from ionizing radiation, institutional controls to inhibit human intrusion, and a long-lasting cover to diminish the effects of wind and water erosion.

For the Cold Waste Pond (TRA-08), the selected alternative is excavation followed by disposal at an appropriate facility. Additional field and laboratory data will be obtained beforehand to optimize excavation activities. Current administrative controls designed to protect worker health and safety will be maintained.

The major components of the selected remedy for the Cold Waste Pond are:

- Sampling to identify hot spots
- Excavation of hot spots that are above acceptable levels
- Disposal at an appropriate location (e.g., Warm Waste Pond, 1957 cell).

The selected remedy addresses the principal risks posed by the Cold Waste Pond by effectively removing the source of contamination and thus breaking the pathway by which a future receptor may be exposed.

The selected remedy for the Soil Surrounding Hot Waste Tanks at Building 613 (TRA-15) is Limited Action, consisting of continued use of existing administrative controls and implementation of long-term environmental monitoring for a period of at least 100 years to protect current and future occupational receptors. On the basis of predicted radioactive decay, no further action is expected at the end of 100 years. Five-year reviews would be conducted to ensure that the remedy remains protective for the entire period of administrative controls.

Major components of the selected remedy for TRA-15 are:

- Inspection of existing operational controls to assess the adequacy and need for additional institutional controls
- Access restrictions (e.g., fences, posted signs, and permanent markers)
- Restrictions limiting land use for at least 100 years
- Periodic inspection and maintenance to ensure integrity of institutional controls
- Review of the remedy no less than every 5 years until determined by the regulatory agencies to be unnecessary.

The selected remedy addresses the principal risks posed by the Soil Surrounding Hot Waste Tanks at Building 613 by effectively preventing access to the area and exposure to contaminated media.

For the Soil Surrounding Tanks 1 and 2 at Building 630 (TRA-19) and the Brass Cap Area, the selected alternative is Limited Action, with the contingency that, when controls established under the Limited Action are not maintained, then an excavation and disposal option would be implemented (to a maximum of 10 ft). This Limited Action alternative is preferred because the contamination associated with these two sites is located under the ground surface in and around active radioactive waste piping and tank systems and buildings where access is physically limited. Therefore, excavation alternatives are not fully implementable at this time, because it cannot be ensured that adequate contamination could be removed to eliminate the need for the controls that would be in place under the Limited Action alternative.

If during 5-year reviews it is determined that the controls established under the Limited Action alternative could not be maintained or do not continue to be protective, then the contingency of excavation and disposal would be implemented. Selection of the Limited Action alternative requires that existing administrative controls, such as access restrictions and worker protection programs, be maintained to prevent exposure to workers or future inhabitants above acceptable levels and long-term environmental monitoring to be implemented.

Major components of the selected remedy for TRA-19 and the Brass Cap Area are:

- Inspection of existing operational controls to assess the adequacy and need for additional institutional controls
- Access restrictions (e.g., fences, posted signs, and permanent markers)
- Restrictions limiting land use for at least 100 years
- Periodic inspection and maintenance to ensure integrity of institutional controls
- Review of the remedy no less than every 5 years, until determined by the agencies to be unnecessary
- Once controls established under the limited action are not maintained (no longer than 100 years) or do not continue to be protective, then excavation and disposal of contaminated soil will be implemented.

The selected remedy addresses the principal risks posed by the Soil Surrounding Tanks 1 and 2 at Building 630 (TRA-19) and the Brass Cap Area by effectively preventing access to the area so that exposure to contaminated media resulting in an unacceptable risk to human health and the environment would not be possible. In addition, if controls established under the Limited Action were not maintained, then excavation and removal of contaminated media would effectively remove the source of contamination and thus break the pathway by which future receptors may be exposed.

The identification of Limited Action as the preferred alternative with an excavation and disposal contingency is based on the 100-year industrial land use assumption for TRA. The validity of this assumption will be evaluated during the 5-year review process. However, the maximum duration of time for which this assumption may be considered valid is up to 100 years from the signing of this ROD.

For the Sewage Leach Pond Berms and Soil Contamination Area, the selected remedy is Limited Action (existing administrative/institutional controls, including implementation of long-term environmental monitoring) for a period of at least 100 years to protect current and future occupational receptors. However, through radioactive decay, it is estimated that no further action would be needed at the end of the 100-year period. Consistent with the Sewage Leach Pond remedy, however, the windblown radionuclide-contaminated soil berms will be placed in the bottom of the pond as part of the native soil cover. This remedy will continue to prevent or reduce potential occupational exposure to acceptable levels for the 100-year period that institutional controls are in place. The 5-year review process would be used to ensure that the remedy remains effective.

Major components of the selected remedy for Sewage Leach Pond Berms and Soil Contamination Area are:

- Inspection of existing operational controls to assess the adequacy and need for additional institutional controls
- Access restrictions (e.g., fences, posted signs, and permanent markers)
- Restrictions limiting land use for at least 100 years
- Periodic inspection and maintenance to ensure integrity of institutional controls
- Review of the remedy no less than every 5 years until determined by the agencies to be unnecessary.

The selected remedy addresses the principal risks posed by the Sewage Leach Pond Berms and Soil Contamination Area by effectively preventing access to the area so that exposure to contaminated media would result in an unacceptable risk to human health and the environment while radioactive decay occurs.

For the Snake River Plain Aquifer and the Deep Perched Water System, the OU 2-12 ROD remains in place. The Warm Waste Pond, which was the major source of contamination in the perched groundwater, has been replaced by a new lined pond. A monitoring plan will be developed in accordance with the OU 2-13 Remedial Design/Remedial Action Scope of Work, which integrates the monitoring needs of both OU 2-12 and OU 2-13. Until that time, monitoring will continue to be performed as prescribed in the OU 2-12 monitoring plan. Groundwater monitoring will be conducted to verify that contaminant concentration trends follow those predicted by the groundwater model. Computer modeling shows that through natural radioactive decay, natural attenuation, and dispersion, contaminants in the groundwater will steadily decrease to acceptable levels within the next 20 years, which is consistent with the time of continued operations at the TRA. Existing institutional controls, which include land use and property access restrictions, will continue to be maintained. The CERCLA 5-year review process will be used to verify that this recommendation remains protective.

The No Action alternative is reaffirmed and selected as the appropriate alternative for the remaining 47 sites at the TRA on the basis of risks being at an acceptable level or due to the lack of known or suspected contaminant releases to the environment.

The possibility exists that contaminated environmental media not identified by the INEEL FFA/CO or in this comprehensive investigation will be discovered in the future as a result of routine operations, maintenance activities, and decontamination and dismantlement activities at TRA. Upon discovery of a new contaminant source by DOE, IDHW, or EPA, that contaminant source will be evaluated and appropriate response action taken in accordance with the FFA/CO. In addition, legacy waste that has been generated as a result of previous sampling activities at WAG 2 (i.e., investigation derived waste) will be appropriately characterized, assessed, and dispositioned in accordance with regulatory requirements to achieve remediation goals consistent with remedies established for sites under this ROD.

Statutory Determination

The selected remedy for each site has been determined to be protective of human health and the environment, to comply with federal and state requirements that are legally applicable or relevant and appropriate (applicable or relevant and appropriate requirements to the remedial actions), and to be cost effective.

These remedies use permanent solutions and alternative treatment technologies to the maximum extent practicable. However, because treatment of radionuclide-contaminated soil is not found to be practical, these remedies do not satisfy the statutory preference for treatment as a principal element of the remedy. The EPA's preference for sites that pose relatively low long-term threats or where treatment is impractical is engineering controls, such as containment. In the case of mercury contamination at the Chemical Waste Pond, the preference for treatment will be fulfilled if the post-ROD sampling indicates that excavation, treatment, and disposal are necessary.

For those sites where contaminants are to be left in place (containment and Limited Action) in excess of health-based levels, a review will be conducted every 5 years after ROD signature (statutory 5-year review) to ensure that the remedy is still effective in protecting human health and the environment and to assess the need for future long-term environmental monitoring and administrative/institutional controls. These comprehensive statutory 5-year reviews will be conducted to evaluate factors such as contaminant migration from sites where contamination has been left in place, effectiveness of institutional controls, and overall effectiveness of the remedial actions. For the Limited Action remedy, it is assumed that the institutional controls will remain in place for at least 100 years. The identification of Limited Action with an excavation and disposal option contingency as the selected alternative for TRA-19 and Brass Cap Area is based on the 100-year industrial land use assumption for the TRA. However, the maximum duration of time for which this assumption may be considered valid for purposes of this ROD is up to 100 years from the signing of this ROD.

The agencies agree that no action be taken at 47 additional sites. For those sites for which no action is being taken based on land use assumptions, those assumptions will be reviewed as part of the 5-year review.

Signature Sheet

Signature sheet for the Record of Decision for OU 2-13, located in Waste Area Group 2, Test Reactor Area, of the Idaho National Engineering and Environmental Laboratory, between the U.S. Department of Energy and the Environmental Protection Agency, with concurrence by the Idaho Department of Health and Welfare.

Chuck Clarke | 12-17-97

Chuck Clarke, Regional Administrator
Region 10
U.S. Environmental Protection Agency

Date

Signature Sheet

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Wallace N. Cory

Wallace N. Cory, Administrator
Division of Environmental Quality
Idaho Department of Health and Welfare

12/22/97

Date

Signature Sheet

Signature sheet for the Record of Decision for OU 2-13, located in Waste Area Group 2, Test Reactor Area, of the Idaho National Engineering and Environmental Laboratory, between the U.S. Department of Energy and the Environmental Protection Agency, with concurrence by the Idaho Department of Health and Welfare.

John Wilcynski, Manager
U.S. Department of Energy Idaho Operations Office

12/3/97
Date

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FIGURES

TABLES

ACRONYMS

ARAR	applicable or relevant and appropriate requirement
ATR	Advanced Test Reactor
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	contaminant of concern
COCA	Consent Order and Compliance Agreement
COPC	contaminant of potential concern
DOE	U.S. Department of Energy
DOE-ID	U.S. Department of Energy Idaho Operations Office
EMS	Environmental Management System
EPA	U.S. Environmental Protection Agency
ERA	ecological risk assessment
ETR	Engineering Test Reactor
FFA/CO	Federal Facility Agreement and Consent Order
FRG	final remediation goal
FS	feasibility study
HQ	hazard quotient
IDHW	Idaho Department of Health and Welfare
INEEL	Idaho National Engineering and Environmental Laboratory
IRIS	(EPA) Integrated Risk Information System
LMITCO	Lockheed Martin Idaho Technologies Company
MCL	maximum contaminant level
MTR	Materials Test Reactor

NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NESHAP	National Emission Standards for Hazardous Air Pollutants
NPL	National Priorities List
OU	operable unit
PCB	polychlorinated biphenyl
PRG	preliminary remediation goals
RAO	remedial action objective
RCRA	Resource Conservation and Recovery Act
RI	remedial investigation
ROD	Record of Decision
SRPA	Snake River Plain Aquifer
SVOC	semivolatile organic compound
TBC	to be considered
TCLP	toxicity characteristic leaching procedure
TRA	Test Reactor Area
TSCA	Toxic Substances Control Act
UCL	upper confidence level
USGS	United States Geological Survey
VOC	volatile organic compound
WAG	Waste Area Group

Waste Area Group 2
Record of Decision

1. DECISION SUMMARY

1.1 Site Name, Location, and Description

The Idaho National Engineering and Environmental Laboratory (INEEL) is a government facility managed by the U.S. Department of Energy (DOE), located 32 mi (51.5 km) west of Idaho Falls, Idaho, and occupies 890 mi^2 (2,305 km^2) of the northeastern portion of the Eastern Snake River Plain. The Test Reactor Area (TRA) is located in the west-central portion of the INEEL, as shown in Figure 1-1. To better manage environmental investigations, the INEEL is divided into ten Waste Area Groups (WAGs). Identified contaminant release sites in each WAG were in turn divided into operable units (OUs) to expedite the investigations and any required remedial actions. Waste Area Group 2 covers the TRA and contains 13 OUs that were investigated for contaminant releases to environmental pathways. Within these 13 OUs, 55 known or suspected contaminant release sites have been identified. This Record of Decision (ROD) applies to these 55 sites, which, on the basis of the comprehensive remedial investigation(RI)/feasibility study (FS) for WAG 2, were identified as posing a potential risk to human health and/or the environment. Of those 55 sites, 47 are being recommended for "No Action." The locations of the eight sites where remedial action is proposed are shown in Figure 1-2.

Facilities at the INEEL are primarily dedicated to nuclear research, development, and waste management. Surrounding areas are managed by the Bureau of Land Management for multipurpose use. The developed area within the INEEL is surrounded by a 500-mi^2 (1,295-km^2) buffer zone used for cattle and sheep grazing. Communities nearest to the TRA are Atomic City (south), Arco (west), Butte City (west), Howe (northwest), Mud Lake (northeast), and Terreton (northeast). In the counties surrounding the INEEL, approximately 45% is agricultural land, 45% is open land, and 10% is urban. Sheep, cattle, hogs, poultry, and dairy cattle are produced; and potatoes, sugar beets, wheat, barley, oats, forage, and seed crops are cultivated. Most of the land surrounding the INEEL is owned by private individuals or the U.S. Government, as shown in Figure 1-3.

Public access to the INEEL is strictly controlled by fences and security personnel. State Highways 22, 28, and 33 cross the northeastern portion of the INEEL approximately 20 mi (32.2 km) away, and U.S. Highways 20 and 26 cross the southern portion approximately 5 mi (8 km) away. A total of 90 mi (145 km) of paved highways pass through the INEEL and are used by the general public.

The TRA was established in the early 1950s for studying the effects of radiation on materials, fuels, and equipment. Three major reactors have been built at the TRA, including the Materials Test Reactor (MTR), the Engineering Test Reactor (ETR), and the Advanced Test Reactor (ATR). The ATR is currently the only major operating reactor at the TRA. Approximately 420 people are employed at the TRA.

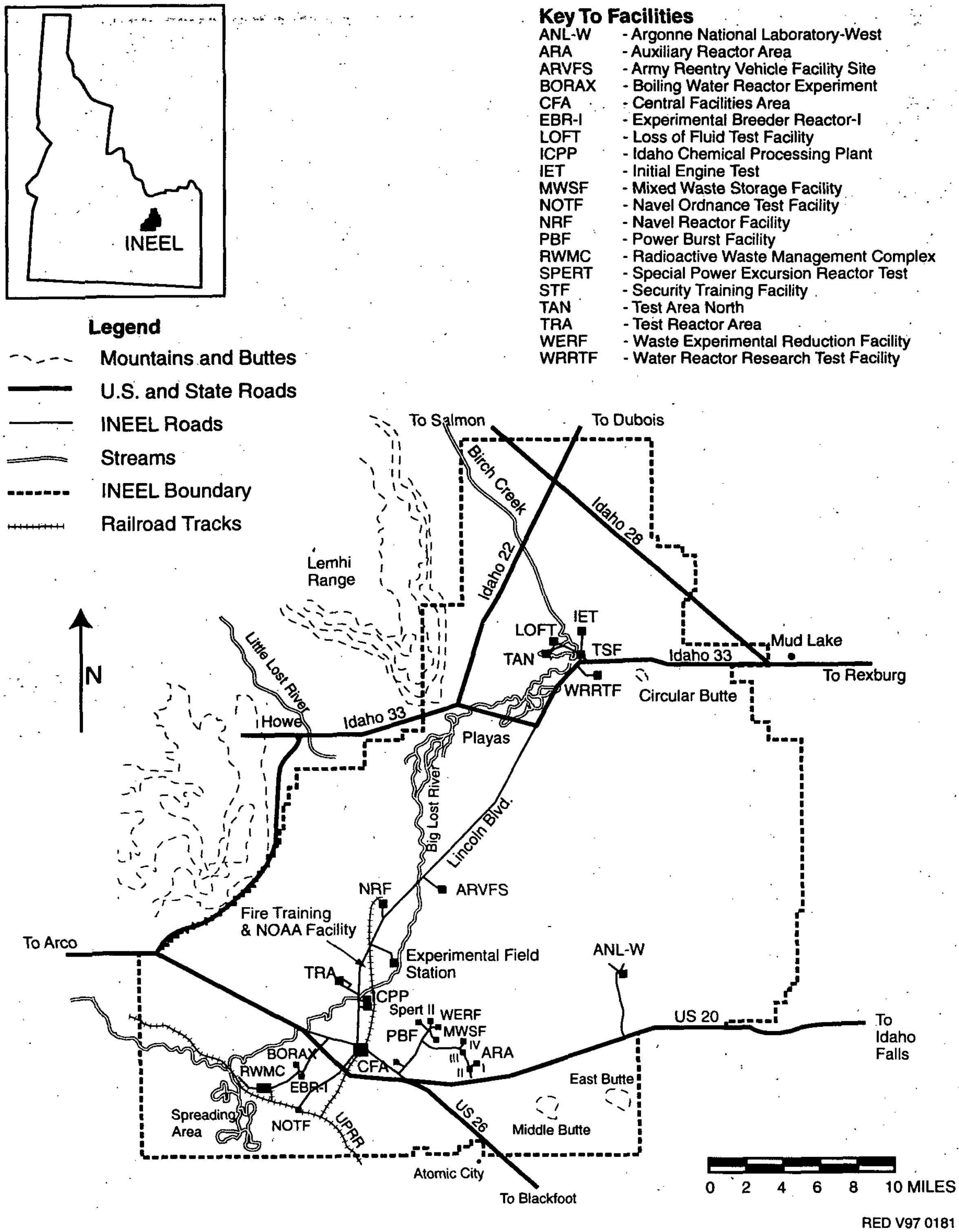
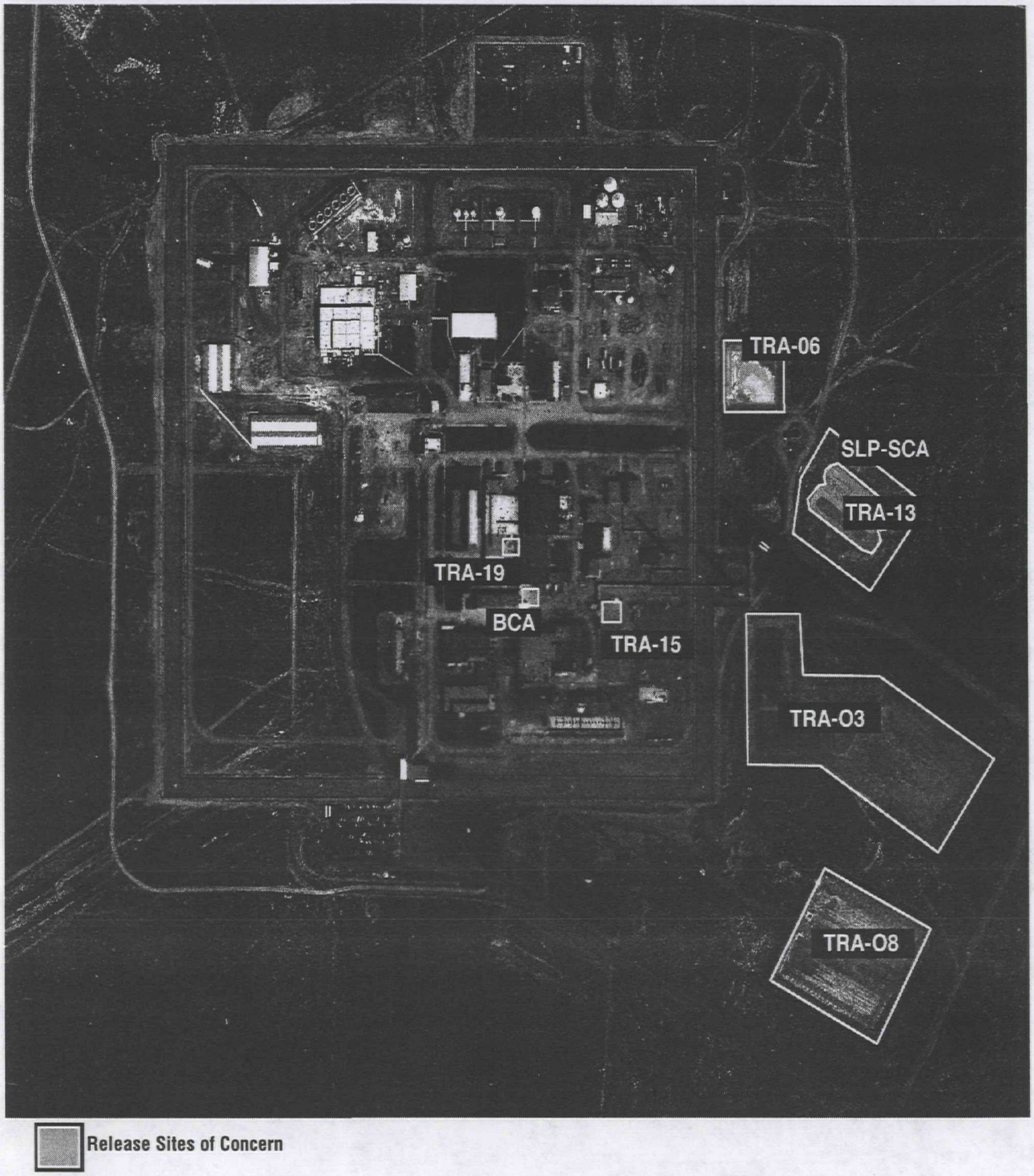


Figure 1-1. Location of the Test Reactor Area.



Operable Unit No.	FFA/CO Reference No.	Site Description
2-05	TRA-15	Soil Surrounding Hot Waste Tanks at TRA-613
2-05	TRA-19	Soil Surrounding Tanks 1-2 at TRA-630
2-09	TRA-08	Cold Waste Pond (TRA-702)
2-09	TRA-13	Sewage Leach Ponds (2) by TRA-732
2-09	None	Sewage Leach Pond Berm and Soil Contamination Area (SLP-SCA)
2-10	TRA-03	Warm Waste Pond Sediments (Cells 1952, 1957, and 1964)
2-13	TRA-06	Chemical Waste Pond (TRA-701)
2-13	None	Brass Cap Area (BCA)

Figure 1-2. Location of Test Reactor Area sites of concern.

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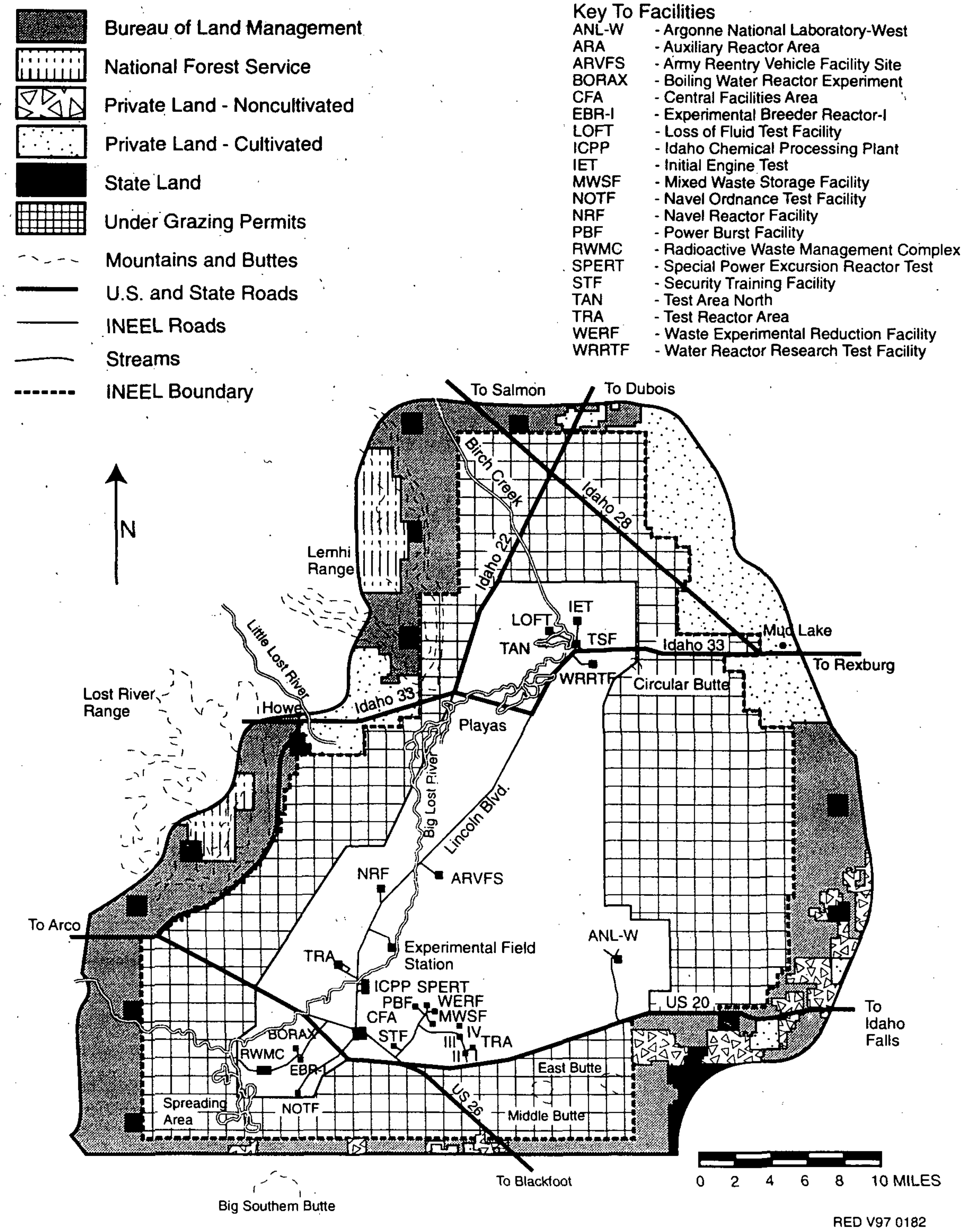


Figure 1-3. Land ownership distribution in the vicinity of the INEEL and onsite areas open for permit grazing.

The Snake River Plain Aquifer (SRPA), the largest potable aquifer in Idaho, underlies the Eastern Snake River Plain and the INEEL. The aquifer is approximately 200 mi (322 km) long, 20 to 60 mi (32.2 to 96.5 km) wide, and covers an area of approximately 9,600 mi^2 (24,853 km^2). The depth to the SRPA varies from approximately 200 ft (61 m) in the northeastern corner of the INEEL to approximately 900 ft (274 m) in the southeastern corner, a distance of 42 mi (67.6 km). Depth to groundwater is approximately 480 ft (146.3 m) below TRA. Drinking water for employees at TRA is obtained from production wells in the northeastern part of the facility.

2. SITE HISTORY AND ENFORCEMENT ACTIVITIES

The TRA was established in the 1950s as a testing area for studying the effects of radiation on materials, fuels, and equipment. In July 1989, the Environmental Protection Agency (EPA) proposed listing the INEEL on the National Priorities List (NPL) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The EPA issued a final ruling that listed INEEL as an NPL site in November 1989. The Federal Facility Agreement and Consent Order (FFA/CO) was developed to establish the procedural framework and schedule for developing, prioritizing, implementing, and monitoring response actions at the INEEL in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Resource Conservation and Recovery Act (RCRA), and the Idaho Hazardous Waste Management Act. The FFA/CO identified 13 OUs within TRA WAG 2 that required further study under the CERCLA process. An additional 10 sites were determined to need no further action at the time the FFA/CO was signed.

The DOE, EPA, and Idaho Department of Health and Welfare (IDHW) decided that hazardous waste release sites at TRA would be remediated through the CERCLA process, as defined in the FFA/CO, which superseded the existing RCRA-driven Consent Order and Compliance Agreement requirements. An investigation was conducted in 1990 at the TRA Warm Waste Pond to support a remedial decision required under CERCLA. An Interim Action ROD was signed in 1991, and an interim action was conducted at the Warm Waste Pond in 1993. The interim action consisted of (1) consolidating sediments contaminated above the action level of 690 pCi/g cesium (Cs)-137 for the Warm Waste Pond 1964 cell and backfilling the 1964 cell with clean material; (2) placing the contaminated Warm Waste Pond 1964 cell sediments into the Warm Waste Pond 1952 cell; (3) collapsing the contaminated sidewalls into the base of the Warm Waste Pond 1957 cell; and (4) covering the contaminated Warm Waste Pond 1957 cell sediments with clean material.

In December 1992, the ROD was issued for OU 2-12, the TRA Perched Water System. The selected remedy was "No Action" with continued groundwater monitoring and a 3-year review of the monitoring system. After 3 years of post-ROD monitoring, chromium and tritium concentrations in two of the SRPA monitoring wells remain above drinking water standards. Overall, good agreement between actual and expected concentrations for other contaminants exists on the basis of the 3 years of study since the OU 2-12 ROD was signed. The deep perched water system wells show that removing the Warm Waste Pond from service has reduced concentrations with time. In general, all monitoring wells show a decreasing contaminant concentration trend, with the exception of one well with chromium and one well with tritium, which show a statistical increase with time. The objectives of the monitoring program are to verify contaminant concentration trends in the SRPA, as predicted by computer modeling, and to evaluate the effect that discontinuing discharge to the Warm Waste Pond has had on contaminant concentrations in the SRPA and the deep perched water system. Since July 1993, groundwater monitoring has been conducted at a network of SRPA wells in the vicinity of the TRA and for selected deep perched water zone wells. This monitoring, currently conducted semiannually, is anticipated to continue until January 1998, at which time the scope of continued future monitoring under the OU 2-13 ROD is anticipated to have been established and implemented.

Localized areas of radionuclide-contaminated soil were located in the North Storage Area and north of the North Storage Area fence at TRA. This soil contamination was removed in the summer of 1995 and 1996 as part of an INEEL-wide cleanup of radioactively contaminated surface soil. Confirmation samples show that removal of this contamination was effective.

The OU 2-13 comprehensive RI/FS conducted at the TRA resulted in the identification of eight sites with potential risk to human health and requiring some type of remedial action (DOE/ID-10531, February 1997). The Proposed Plan (March 1997) identified the agencies' preferred alternative for each site of concern.

3. HIGHLIGHTS OF COMMUNITY PARTICIPATION

In accordance with CERCLA §113(k)(2)(B)(i-v) and §117, a series of opportunities for public information and participation in the RI and decision process for the WAG 2, TRA, was provided to the public from September 1995 through May 1997. The opportunities to obtain information and provide input included "kick-off" and "update" fact sheets, which briefly discussed the status of the comprehensive investigation, numerous *INEEL Reporter* newsletter articles (a publication of the INEEL's Environmental Restoration Program), two Citizens' Guide supplemental updates, a proposed plan, and focus group interactions, which included teleconference calls, briefings and presentations to interest groups, and public meetings. In addition, many public involvement activities were conducted during two previous investigations and RODs at the TRA. The RODs for the Warm Waste Pond Interim Action (1991) and the Perched Water Remedial Investigation (1992) contain summaries of the public involvement activities that were associated with these two former investigations at TRA.

In September 1994, a kick-off fact sheet concerning the WAG 2, TRA comprehensive RI/FS was sent to about 6,700 individuals of the general public and to 60 INEEL employees on the Community Relations Plan mailing list. Included in the fact sheet was a postage-paid return mailer comment form. A total of five comments were received from the public. These comments were evaluated and considered in the preparation stage of the project workplan. In fall of 1994, three public open houses, held in Idaho Falls, Boise, and Moscow allowed citizens an opportunity to interact with DOE Idaho Operations Office (DOE-ID) and Lockheed Martin Idaho Technologies Company employees concerning the nature and extent of the investigation. It was the initial opportunity for the public to be involved in how the investigation would be conducted.

The project was discussed at an informal availability session in Twin Falls (October 11, 1994) and in Pocatello (October 13, 1994). The same opportunity for informal interactions with agency and INEEL representatives was provided for Moscow (October 18, 1994), Boise (October 19, 1994), and Idaho Falls (October 20, 1994). During these briefings, representatives from the DOE and the INEEL discussed the project, answered questions, and listened to public comments and concerns.

Regular reports concerning the status of the project were included in bimonthly issues of the *INEEL Reporter* and were mailed to those on the mailing list. Reports also appeared in two issues of a *Citizens' Guide* to environmental restoration at the INEEL (a supplement to the *INEEL Reporter*) in early 1996 and 1997.

In March 1997, another update fact sheet concerning the project was sent to about 6,700 people on the INEEL Community Relations Plan mailing list. On March 10, 1997, DOE-ID issued a news release to more than 100 media contacts concerning the beginning of a 30-day public comment period pertaining to the WAG 2 TRA proposed plan. This period began March 10, 1997. In response to a request from the public, the comment period was extended 30 days and ended May 9, 1997. Many of the news releases resulted in a short note in community calendar sections of newspapers and in public service announcements on radio stations. Both the fact sheet and news release gave notice to the public that WAG 2 TRA investigation documents would be available before the beginning of the comment period. These documents were available in the Administrative Record section of the INEEL Information Repositories located in the INEEL Technical Library in Idaho Falls, in the INEEL Boise Office, and in public libraries in Fort Hall, Pocatello, and Moscow.

Opportunities for public involvement in the decision-making process concerning the WAG 2 TRA proposed plan began in September 1996 with the establishment of a citizens "focus group" to review the INEEL's Community Relations Plan. The focus group of eight citizens was convened to critique the adequacy of the Community Relations Plan in meeting the public's need for information on the "comprehensive" investigations for an entire WAG. As a result of group interaction with DOE-ID, the State of Idaho, and EPA Region X project managers, it was decided that, for the first time, draft documents being prepared for the upcoming public involvement activities could be reviewed by focus group members. Two teleconference calls to review and discuss the layout and user-friendliness of the information contained in the WAG 2 documents were held in early January for the draft fact sheet and in early February for the draft proposed plan. As a result of focus group recommendations, many of the suggestions identified by the focus group were incorporated into the documents prior to their release to the general public.

For the general public, the activities associated with participating in the decision-making process included receiving the proposed plan, receiving telephone calls, attending the availability sessions one-half hour before the public meetings to informally discuss the issues, and submitting verbal and written comments to the agencies during the 60-day public comment period. At the request of the Shoshone-Bannock Tribes, the three agencies met at Fort Hall in January and March 1997 to give Tribal members and their technical staff a briefing on this proposed plan, as well as on other RIs underway at the INEEL. It was during the second briefing that the Tribes submitted a request for the 30-day extension of the comment period.

Copies of the proposed plan were mailed to 6,700 members of the public on the INEEL Community Relations Plan mailing list on March 7, 1997, urging citizens to comment on the proposed plan and to attend public meetings. Display advertisements announcing the same information concerning the availability of the proposed plan and the locations of public meetings, and the comment period extension, appeared in six regional newspapers during the weeks of March 9, 16, and 23 in Idaho Falls, Boise, Moscow, Fort Hall, Pocatello, and Twin Falls. Large display advertisements appeared in the following newspapers: the Post Register (Idaho Falls); the Sho-Ban News (Fort Hall); the Idaho State Journal (Pocatello); the Times News (Twin Falls); the Idaho Statesman (Boise); and the Daily News (Moscow).

The update fact sheet was mailed on March 21, 1997, to about 6,700 members of the public on the INEEL Community Relations Plan mailing list to encourage them to attend the public meetings and to provide verbal or written comments. Notice was provided in the fact sheet and on its back cover, explaining that the comment period had been extended to May 9, 1997. A series of three news releases and newspaper advertisements, including the notice of the extension of the comment period, provided public notice of these public involvement activities. Offerings for briefings and the 30-day public comment period (including the 30-day extension of the comment period) that was to begin March 10 and end May 9, 1997, were also announced. Personal calls were made to stakeholders in the Idaho Falls, Pocatello, Ketchum, Boise, and Moscow areas the weeks of March 10, 17, and 24 to remind individuals about the meetings and to see if a briefing was desired.

Written comment forms available at the meeting locations (including a postage-paid business-reply form) were available to those attending the public meetings. The forms were used to submit written comments either at the meeting or by mail. The reverse side of the meeting agenda contained a form for the public to use in evaluating the effectiveness of the meetings. A court reporter was present at each meeting to keep transcripts of discussions and public comments. The meeting transcripts were placed in the Administrative Record section for the WAG 2, TRA, OU 2-13 in five INEEL Information Repositories. For those who could not attend the public meetings, but wanted to make formal written comments, a postage-paid written comment form was attached to the proposed plan.

A Responsiveness Summary has been prepared as part of the ROD. All formal verbal comments presented at the public meetings and all written comments are included in Appendix A and in the Administrative Record for the ROD. Those comments are annotated to indicate which response in the Responsiveness Summary addresses each comment.

A total of about 20 people not associated with the project attended the public meetings. Overall, twenty citizens provided formal comments; of these, six citizens provided verbal comments, and fourteen provided written comments. All comments received on the proposed plan were considered during the development of this ROD. The decision for this action is based on the information in the Administrative Record for these OUs.

On March 19, 1997, project managers from DOE-ID gave a brief presentation on the projects to the INEEL Environmental Management Site-Specific Advisory Board. The advisory board is a group of 15 individuals, representing the citizens of Idaho, who make recommendations to DOE, EPA, and the State of Idaho regarding environmental restoration activities at the INEEL.

4. SCOPE AND ROLE OF OPERABLE UNITS AND RESPONSE ACTIONS

The primary source of contamination at WAG 2 is past discharges and releases associated with the TRA warm waste system. For example, radiologically contaminated wastewater was discharged to the Warm Waste Pond. Discharges to the Warm Waste Pond caused contamination of the sediments in the cells of the unit. The Warm Waste Pond was taken out of service and an interim remedial action has been completed (OU 2-10). Infiltration of water from the cells caused the migration of contaminants to the TRA Deep Perched Water System, and ultimately to the SRPA beneath TRA. A ROD has been signed for the Perched Water System (OU 2-12), and post-ROD monitoring is in progress. Windblown contamination, spread principally from the Warm Waste Pond, is the suspected source of contaminations at the Sewage Leach Pond Berm and Soil Contamination Area. In addition, minor areas of contamination are associated with waste lines and storage tanks in the warm waste system. The tanks in OU 2-05 are, or were, part of the warm waste system, and they have associated releases of contamination (TRA-15 and TRA-19). Radiological contamination at the Brass Cap Area is attributed to leaks from the warm waste lines. Waste Area Group 2 also includes sites that have been contaminated as a result of other operational processes such as the Chemical Waste Pond, Sewage Leach Pond, and Cold Waste Pond. Contaminated sediments remain in these unlined disposal ponds.

The TRA is designated as WAG 2 at the INEEL. Each of these OUs contains a number of contaminant release sites. A total of 13 OUs were investigated under a comprehensive RI/FS to evaluate contamination of environmental pathways (soil, air, and groundwater) and the potential risks to human health and the environment from exposure to contaminated media. Each site has been evaluated comprehensively in relation to the other sites to determine the overall risk posed to human health and the environment. A total of 55 known or suspected contaminant release sites were identified. In order to satisfy the broader objective of INEEL comprehensive risk assessments, an analysis of risk produced through the air and groundwater exposure pathways is evaluated in a cumulative manner. A cumulative analysis of these two exposure pathways involves calculating one WAG-wide risk number for each contaminant of potential concern (COPC) in each air and groundwater exposure route. Analyzing the air and groundwater pathways in a cumulative manner is necessary because contaminations from all release sites within a WAG are typically isolated from one another with respect to the soil pathway exposure routes. Therefore, the soil pathway exposure route is analyzed on a release site specific or "noncumulative" basis in the INEEL comprehensive risk assessments. Monitoring data, process knowledge, written correspondence, interviews with current and previous employees, previous agency investigations and decisions, and site characterization data were used to determine the nature and extent of contamination at each site and to evaluate potential risks to human health and the environment. Eight of the 55 sites were found to pose risks to human health that exceed acceptable risk levels and were therefore evaluated for remedial action. The screening, development, and detailed analysis of remedial alternatives resulted in the selection of preferred alternatives for each of the eight sites. These alternatives met the goals established for reducing or eliminating risks to human health and the environment and for complying with applicable or relevant and appropriate requirements (ARARs).

In addition to the eight sites that require some type of remedial action, this comprehensive ROD also addresses 47 sites that do not pose an unacceptable risk to human health or the environment, based on evidence compiled during the comprehensive RI/FS. These sites are being recommended for No Action and, with approval of this ROD, the No Action decision is formalized. Table 4-1 contains a complete listing of the sites at WAG 2; Section 5.2.5 provides a description of the proposed No Action sites.

Table 4-1. List of WAG 2 sites.

Operable Unit	Site Number	Site Name
None	TRA-10	TRA MTR Construction Excavation Pile
	TRA-23	TRA ETR Excavation Site Rubble Pile
	TRA-24	TRA Guardhouse Construction Rubble Pile
	TRA-25	TRA Sewer Plant Settling Pond Rubble Pile
	TRA-26	TRA Rubble Site by U.S. Geological Survey Observation Well
	TRA-27	TRA North Storage Area Rubble Pile
	TRA-28	TRA North (Landfill) Rubble Site
	TRA-29	TRA ATR Construction Rubble
	TRA-32	TRA West Road Rubble Pile
	TRA-33	TRA West Staging Area/Drainage Ditch Rubble Site
OU 2-01	TRA-02	TRA Paint Shop Ditch (TRA-606)
OU 2-02	TRA-14	TRA Inactive Gasoline Tank at TRA-605
	TRA-17	TRA Inactive Gasoline Tank at TRA-616
	TRA-18	TRA Inactive Gasoline Tank at TRA-619
	TRA-21	TRA Inactive Tank, North Side of MTR-643
	TRA-22	TRA Inactive Diesel Fuel Tank at ETR-648
OU 2-03	None	TRA-614 Oil Storage North
	TRA-01	TRA Acid Spill Disposal Pit
	TRA-11	TRA French Drain at TRA-645
	TRA-12	TRA Fuel Oil Tank Spill (TRA-727B)
	TRA-20	TRA Brine Tank (TRA-731) at TRA-631
	TRA-40	TRA Tunnel French Drain (TRA-731)
OU 2-04	None	TRA PCB Spill at TRA-619
	None	TRA PCB Spill at TRA-626
	None	TRA-627 No. 5 Oil Spill
	None	TRA PCB Spill at TRA-653
	None	TRA-670 Petroleum Product Spill
	None	TRA PW 13 Diesel Fuel Contamination
	TRA-09	TRA Spills at TRA Loading Dock (TRA-722)
	TRA-34	TRA North Storage Area

Table 4-1. (continued).

Operable Unit	Site Number	Site Name
OU 2-05	None	TRA-603/605 Tank
	TRA-15	TRA Hot Waste Tanks Nos. 2, 3, and 4 at TRA-613
	TRA-16	TRA Inactive Radioactive Contaminated Tank at TRA-614
	TRA-19	TRA Radioactive Tanks 1 and 4 at TRA-630, replaced by Tanks 1, 2, 3, and 4
OU 2-06	TRA-30	TRA Beta Building Rubble Site
	TRA-31	TRA West Rubble Site
	TRA-35	TRA Rubble Site East of West Road near Beta Building Rubble Pile
OU 2-07	None	TRA-653 Chromium-Contaminated Soil
	TRA-36	TRA ETR Cooling Tower Basin (TRA-751)
	TRA-38	TRA ATR Cooling Tower (TRA-771)
	TRA-39	TRA MTR Cooling Tower North of TRA-607
OU 2-08	TRA-37	TRA MTR Canal in basement of TRA-603
OU 2-09	TRA-07	TRA Sewage Treatment Plant (TRA-624) and Sludge Pit (TRA-07)
	TRA-08	TRA Cold Waste Disposal Pond (TRA-702)
	TRA-13	TRA Final Sewage Leach Ponds (2) by TRA-732, including SLP-Berm and Soil Contamination Area
OU 2-10	TRA-03B	TRA Warm Waste Pond (sediments)
OU 2-11	TRA-03A	TRA Warm Waste Leach Pond (TRA-758)
	TRA-04	TRA Warm Waste Retention Basin (TRA-712)
	TRA-05	TRA Waste Disposal Well, Sampling Pit (764) and Sump (703)
OU 2-12	None	Perched Water RI/FS
OU 2-13		WAG 2 Comprehensive RI/FS including:
	TRA-06	TRA Chemical Waste Pond (TRA-701)
	TRA-41	French Drain Site
	TRA-42	Diesel Unloading Pit
	None	Brass Cap Area
	None	Hot Tree Site
	None	ETR Stack Area

5. SUMMARY OF SITE CHARACTERISTICS

5.1 Physiography, Geology, and Hydrology

The INEEL is located on the northeastern portion of the Eastern Snake River Plain, a volcanic plateau that is composed primarily of silicic and basaltic volcanic rocks and relatively minor amounts of sediment. Underlying the INEEL is a series of basaltic flows with sedimentary rock interbeds. The basalts beneath the TRA are relatively flat and are covered by 30 to 75 ft (9 to 23 m) of alluvial materials and loess. The alluvial materials are composed primarily of well to poorly graded gravel and contain minor amounts of fine-grained materials.

The depth to the SRPA varies from 200 ft (61 m) in the northern portion to 900 ft (274 m) in the southern portion of the INEEL. At TRA, the depth to the SRPA is approximately 450 ft (137 m). Regional groundwater flow is to the southwest. Above the main aquifer, there are both shallow and deep zones of perched water created by lenses of low permeability sediments (containing silts and clays) within an interbedded basalt-sediment sequence overlying the primary basalt flows. These perched zones are discontinuous and are found at varying depths throughout the TRA.

The climate of the INEEL region is characterized as semidesert with hot summers and cold winters. Normal annual precipitation is 8.71 in. (22.1 cm). The only natural sources of surface water present at the INEEL are Birch Creek, the Little Lost River, and the Big Lost River, which is approximately 1 mi (1.6 km) southeast of the TRA. However, the Big Lost River is typically dry because of the arid climate and high infiltration rates of the alluvium. The only other natural source of surface water at the TRA is occasional heavy precipitation, which results in surface water runoff in natural drainage areas, usually during the period of January through April of each year.

Fifteen distinctive vegetative cover types have been identified at the INEEL, with sagebrush being the dominant species. There are five vegetation types surrounding the TRA: sagebrush-steppe on lava, sagebrush/rabbitbrush, grassland, playa-bareground/disturbed, and juniper. The variety of habitats on the INEEL supports numerous species of reptiles, birds, and mammals. Several bird species warrant special concern because of their threatened status or sensitivity to disturbance. These species include the ferruginous hawk (Buteo regalis), bald eagle (Haliaeetus leucocephalus), prairie falcon (Falco mexicanus), merlin (Falco columbarius), long-billed curlew (Numenius americanus), and the burrowing owl (Athlene cunicularia). The ringneck snake, whose occurrence is considered to be INEEL-wide, is listed by the Idaho Department of Fish and Game as a Category C sensitive species. It should be noted, however, that the TRA is a highly disturbed industrial area with almost continuous human activity that contains little suitable habitat for most of these species. No areas of critical habitat, as defined in 40 Code of Federal Regulations (CFR) Part 300, are known to exist in or around the TRA.

The TRA is located in the south-central portion of the INEEL. The land surface at TRA is relatively flat, with elevations ranging from 4,945 ft (1,507 m) on top of a rubble pile near the Cold Waste Pond to 4,908 ft (1,496 m) at the bottom of the Chemical Waste Pond. Generally, the land surface gently slopes from the west-southwest corner [4,930 ft (1,503 m)] to the east-northeast corner [4,915 ft (1,498 m)].

Much of the INEEL's surface is covered by Pleistocene and Holocene basalt flows. The second most prominent geologic feature is the flood plain of the Big Lost River. Alluvial sediments of Quaternary age occur in a band that extends across the INEEL from the southwest to the northeast. The alluvial deposits grade into lacustrine deposits in the northern portion of the INEEL, where the Big Lost River enters a series of playa lakes. Paleozoic sedimentary rocks make up a very small area of the INEEL along the northwest boundary. Three large silicic domes and a number of smaller basalt cinder cones occur on the INEEL and along the southern boundary.

A complex sequence of basalt flows and sedimentary interbeds underlie TRA. From basalt flow samples collected, petrographically similar basalt flows were correlated into 23 flow groups that erupted from related source areas. Known source vents occur to the southwest, along what is referred to as the Arco volcanic rift zone, to the southeast along the axial volcanic zone, and to the north at Atomic Energy Commission Butte. Surficial material at TRA consists of alluvial and terrace deposits of the Big Lost River and is composed of unconsolidated fluvial deposits of silt, sand, and pebble-sized gravel. The uneven alluvial thickness and undulating basalt surface at TRA are common of basalt flow morphology. The basalt flows that underlie the surficial alluvium are separated by sedimentary interbeds that vary in thickness and lateral extent.

The TRA is located on the alluvial plain of the Big Lost River. The thickness of surficial sediment in the vicinity of TRA ranges from 30 to 75 ft (9 to 23 m) and is greatest south of the facility. The surficial sediments at TRA are primarily composed of well to poorly graded gravel and contain minor amounts of fine-grained materials. Most of the soil textures are sandy loams and the primary soil type is mapped as Bannock sandy loam. The TRA is not located in a 100-year flood plain. An extensive flood control system has been built at the INEEL that uses a diversion gate and a series of spreading areas to control high flows from the Big Lost River, which typically occur in the late spring or early summer.

An area north of TRA where surface runoff accumulates contains some damp areas with sedges and wetland grasses; however, the area is not mapped by the INEEL wetland inventory. It is not expected that any remedial activities would impact these potentially sensitive areas.

The area surrounding TRA has been surveyed in the past, and no sites of archaeological or historical value were found. All potential remedial areas within the fenced area of TRA are considered disturbed areas that do not contain material of archaeological or historic significance. Therefore, the regulatory requirements associated with the preservation of antiquities and archaeological materials/sites are not a concern.

The TRA is not known to be located within a critical habitat of an endangered or threatened species, including bald and golden eagles, nor are such species known to frequent the TRA proximity. However, bald eagles, golden eagles, and American perigrin falcons have been observed at the INEEL. In addition, eight species of concern to the Idaho Department of Fish and Game and Bureau of Land Management have been observed at the INEEL. Remedial activities at WAG 2 are not expected to affect any endangered species because activities are anticipated to be conducted entirely in previously disturbed areas, and limited in both duration and affected area.

No fish or wildlife addressed by the Threatened Fish and Wildlife Act are found at WAG 2, nor do the planned activities at WAG 2 involve the modification of a stream because no streams are located on the site. Occasionally, migratory waterfowl are observed at WAG 2. However, the area contains no critical habitat, and remedial activity does not appear to have a potential for adverse impacts to migratory waterfowl.

Several sites located within the WAG 2 area have been deemed potentially eligible for the National Register of Historic Places by the Idaho State Historical Society. The sites include the MTR, the ETR, and the ATR. These sites must be accorded the same protection under the National Historic Preservation Act as if they were listed sites under the Act. Remedial activities within WAG 2 are not expected to adversely affect the sites; however, should future planning identify activities that would potentially impact the sites, proper mitigative measures would be identified through discussion with the Idaho State Historical Preservation Office.

The SRPA occurs approximately 450 ft (137 m) below TRA and consists of a series of saturated basalt flows and interlayered pyroclastic and sedimentary materials. The EPA designated the SRPA as a sole-source aquifer under the Safe Drinking Water Act on October 7, 1991. The aquifer is relatively permeable because of the presence of fractures, fissures, and voids such as lava tubes in the basalt. Groundwater flow in the SRPA is to the south-southwest at rates between 5 and 20 ft (1.5 and 6 m) per day.

Two perched water zones have been recognized below TRA. In the vicinity of the ponds and retention basin, a shallow perched water zone is formed at a depth of approximately 50 ft (15.2 m). Finer grained sediments and fracture infilling at the alluvium and basalt interface areas impede the downward movement of water, resulting in perched conditions. The shallow perched water eventually percolates through the underlying basalt to a deeper perched water zone. The deep perched water is also caused by low-permeability sediments within the interbedded basalt-sediment sequence and occurs at a depth of approximately 140 to 200 ft (43 to 61 m). These sediments include silt, clay, cinders, and gravel and appear to be laterally continuous in the vicinity of TRA. The shallow and deep perched waters are two separate zones, with the possible exception of the area of the ponds where they may become one zone depending on the volume of wastewater discharge to the ponds. The perched water bodies are present because approximately 200 million gal (757 million L) per year of water have been sent to the TRA disposal ponds over the past several decades. A major contributor to contamination in the perched water bodies resulted from discharges to the old Warm Waste Pond. Low-level radioactive waste discharges were discontinued on August 12, 1993, when the former Warm Waste Ponds were replaced with a lined evaporation pond. The Cold Waste Pond currently receives an average of approximately 300 gal (1,135 L) per minute of uncontaminated wastewater. There appears to be a strong correlation between hydraulic head patterns in the Perched Water System and the discharge rates to the Cold Waste Pond. In addition, discharges to the Chemical Waste Pond, an unlined surface impoundment designed as an infiltration pond to receive chemical waste from the demineralization plant, average approximately 15 gal (57 L) per minute.

Waste Area Group 2 encompasses approximately 74 acres (30 hectares), with the majority of the acreage associated with extensive facilities consisting of buildings, graveled parking areas, roads, and cleared fence lines. Surrounding the TRA, however, are several pond areas that were used for the conveyance and discharge of wastewater from facility operations as shown in Figure 1-2. These ponds contain a variety of potentially hazardous contaminants with the primary contaminants being radionuclides. After several of the ponds were removed from service, exposed sediments were subjected to winds resulting in the surrounding surficial soils being contaminated with low levels of radionuclides. An interim cleanup action occurred at the former warm waste disposal pond.

In addition to the disposal ponds and associated windblown contamination, several other types of potentially contaminated sites were identified at the TRA. These sites include: rubble piles, a paint shop ditch, petroleum tanks, a disposal pit, french drains, brine tank, petroleum and polychlorinated biphenyl (PCB) spills, radiological tanks, cooling towers, a reactor canal, sewage treatment facility, a retention basin, disposal well, and a sampling pit and sump. Possible contaminants consist of organic compounds including petroleum hydrocarbons and PCBs, acids, bases, heavy metals, and radionuclides.

5.2 Nature and Extent of Contamination

The following sections describe the nature and extent of contamination at the eight sites that have been determined to pose an unacceptable risk to human health or the environment. These eight sites within TRA have actual or threatened releases of hazardous substances, which, if not addressed by implementing the response actions selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

5.2.1 Disposal Pond Sites

5.2.1.1 Warm Waste Pond (TRA-03). The source of contamination in sediments of the three cells [1952, 1957, and 1964, (Figure 5-1)] was low-level radionuclide contaminated wastewater discharged to the three cells from TRA reactor operations. The wastewater included cooling tower effluent, wastewater from hot cell drains, laboratory solutions, and floor drainage from the ATR and other test reactors. The resulting contamination consisted primarily of radionuclide-contaminated sediments in the pond bottoms and sidewalls to depths of approximately 2 ft (0.6 m). The primary contaminants of concern (COCs) are Cs-137, cobalt (Co)-60, and chromium (Cr). Concentrations of Cs-137 range from 2.9 to 39,400 pCi/g and of Co-60 range from 0.2 to 27,100 pCi/g. Concentrations of chromium in the sediments ranged from 0 to 222 mg/kg. Data indicate that both chromium and radionuclides were strongly adsorbed into the surficial sediments and that soil contamination generally did not extend beyond a depth of 2 ft (0.6 m) below the base of each cell.

In 1993, the Warm Waste Pond was replaced by a lined evaporation pond. An interim remedial action was subsequently conducted to provide immediate risk reduction by removing approximately 4 ft (1.2 m) of sediment from the sidewall and 3 ft (0.9 m) of sediment from the base of the 1964 cell and placing of these excavated materials into the 1952 cell. Previously stockpiled materials from cleanup of Warm Waste Pond windblown contamination was also placed in the 1952 cell. The 1964 cell was then backfilled with approximately 10 ft (3 m) of clean soil, and the 1952 cell was covered with a 1.0-ft (0.31-m) layer of clean fill and then revegetated. The balance of the stockpiled material was distributed on the sidewalls of the 1957 cell as shielding. The 1957 cell sidewall sediment was then scraped into the base of the 1957 cell followed by disposal of materials from a demolished contaminated wooden structure. The 1957 cell was then covered with a 0.5-ft (0.15-m) layer of clean fill. The 1957 cell was not capped because appropriate fill material was being identified and evaluated. In 1995 and 1996, material from OU 10-06 removal actions was also placed in the 1957 cell, including soil contaminated with Cs-137 from the Argonne National Laboratory stockpile, soil contaminated with Cs-137 from the Boiling Water Reactor Experiment, soil contaminated with Cs-137 from the Experimental Breeder Reactor, soil contaminated with several radionuclides including strontium (Sr)-90, europium (Eu)-152, americium (Am)-241, Cs-137, Eu-154, and Co-60 from the TRA North Storage Area, soil contaminated with Cs-137 and Sr-90 from Test Area North Area B, and soil contaminated with Cs-137 and Sr-90 from the Technical Support Facility. Again, 0.5 ft (0.15 m) of clean fill was placed over these materials. This soil was analyzed for polychlorinated biphenyls (PCBs); however, none were detected. The maximum detection limit of the data set was 0.220 ppm. The agencies have determined that these soils need not be managed as PCB-

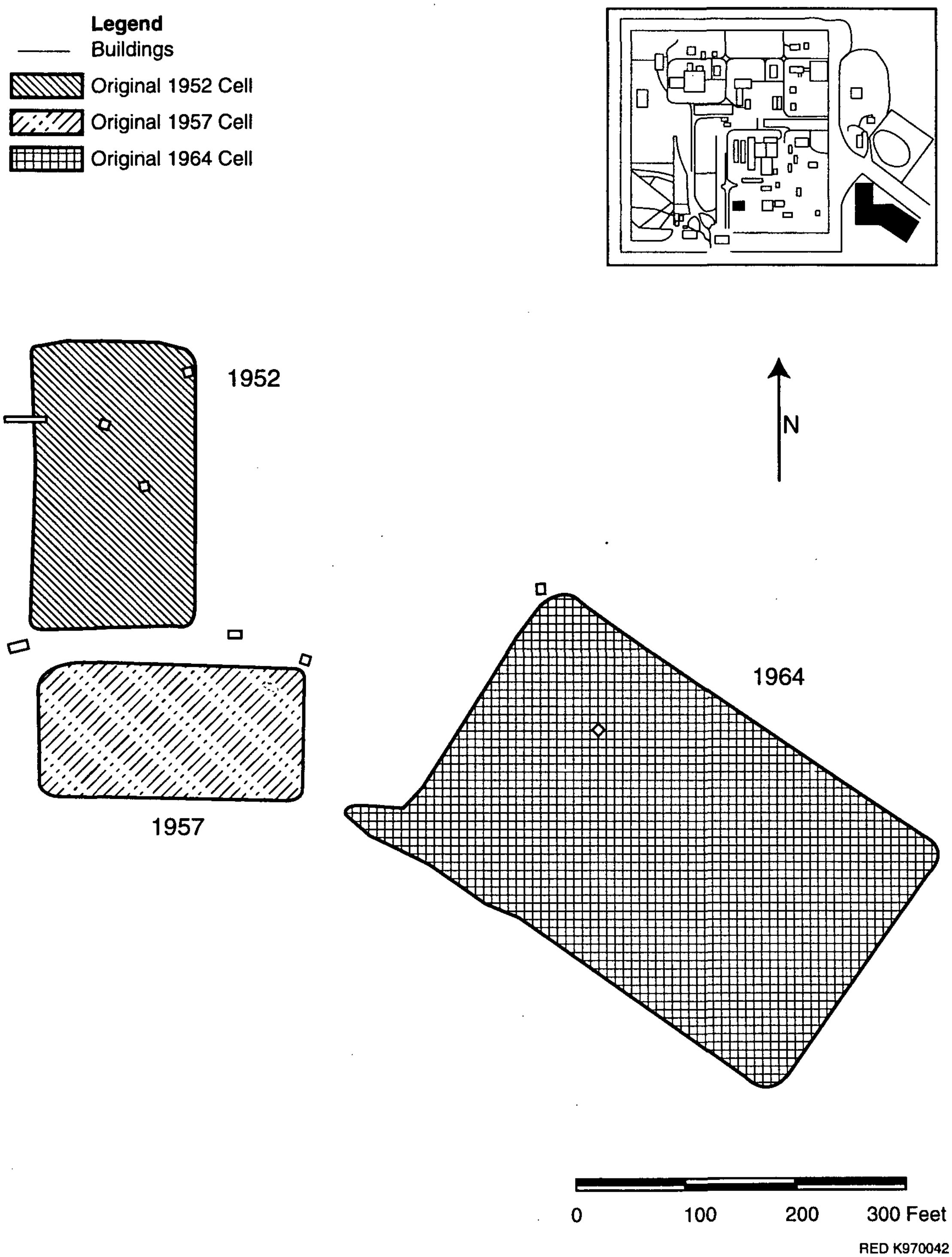


Figure 5-1. Warm Waste Pond (TRA-03) location.

contaminated soil since the residual PCB levels are below the Office of Solid Waste and Emergency Response directive guidance level of 25 ppm at Superfund Sites.

Additionally, recent investigations have determined that RCRA-listed waste may have been present in the TRA Warm Waste System when discharges from the warm waste system to the pond occurred. Soil placed in the warm waste pond from Test Area North may be contaminated with RCRA-listed waste. Information regarding releases of RCRA-listed waste can be found in the "RCRA-listed Waste Determination Report for the INEEL Test Reactor Area, October 30,1997," which has been placed in the Administrative Record. Pages 3-21 through 3-23 of the OU 2-13 comprehensive RI/FS report provide more detailed information on the COC concentrations and volumes of soil consolidated in the OU 2-10 Warm Waste Pond.

5.2.1.2 Chemical Waste Pond (TRA-06). The Chemical Waste Pond was excavated and put into operation in 1962 as an unlined infiltration pond designed to receive chemical waste from a demineralization plant at the TRA. The pond currently receives effluent containing mineral salts, with average discharge to the pond being 15 gal (57 L) per minute. In addition, until 1982, solid and liquid wastes were disposed directly into the pond from a support structure constructed for waste disposal. This disposal included corrosives and other waste. A tank containing battery acid from the vehicle storage facility at the Central Facilities Area was drained into the Chemical Waste Pond in 1992. Possible disposals into the pond, including pesticides, solvents, PCBs, methylene chloride, and biocides, are suspected, but not documented. However, the Track 1 document for this site indicates that these reports are unsubstantiated. Samples collected from the pond in 1990 (Figure 5-2) were analyzed for metals known to be associated with the demineralization process (i.e., silver, arsenic, barium, cadmium, chromium, copper, mercury, nickel, selenium, and zinc), volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and PCBs. The sample results indicate that only barium and mercury exceed background levels presented in the OU 10-06 soil background document. The Chemical Waste Pond is identified in the FFA/CO as a land disposal unit. Application materials for a wastewater land application permit were submitted to the State of Idaho for review in late January 1997.

Maximum total concentrations of the metals were 3,830 mg/kg for barium and 133 mg/kg for mercury in an area where standing water occurs within the pond. The two metals have the highest concentrations in surface sediments, with concentrations decreasing with depth to background concentrations from 10 to 16 ft (3 to 5 m) below the surface. In the 1990 sampling event, PCBs were detected in 20 surface samples, with a maximum concentration of 0.33 mg/kg; they were not detected in subsurface samples. Volatile organic compounds and SVOC concentrations were either undetectable or below regulatory concern.

The most recent release of hazardous materials occurred in May and June 1995, when approximately 287,100 gal (1,068,788 L) of liquid used to neutralize and flush out-of-service acid and caustic tanks were disposed to the pond. After disposal it was determined that the liquids contained 0.3 ppm of mercury, which exceeds the toxicity characteristic leaching procedure (TCLP) limit of 0.2 ppm for D009 mercury hazardous waste. The total mass of mercury contained in the Chemical Pond from all past disposal operations is estimated to be approximately 8.0E+07 mg. The mercury contribution from the 1995 release is relatively small and is not expected to increase human health or ecological risk at the site.

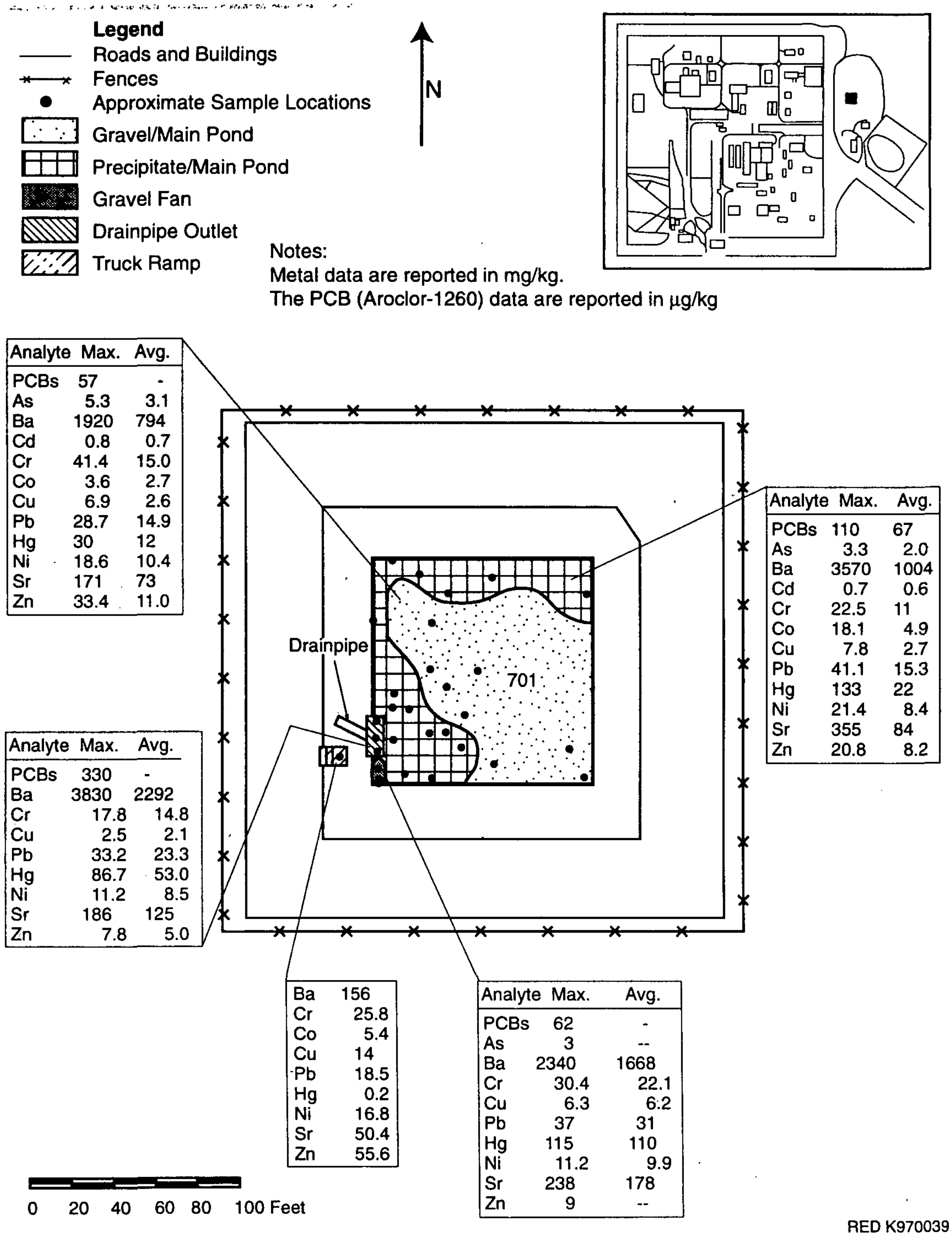


Figure 5-2. Chemical Waste Pond (TRA-06) showing 1990 sample locations with maximum average data for PCBs and metals.

5.2.1.3 *Cold Waste Pond (TRA-08).* The Cold Waste Pond has been continually managed as a disposal site for nonradiologically contaminated wastewater since its construction in 1982. The pond consists of two cells, which are used for cold waste disposal, primarily from cooling tower effluent and from air conditioning units, secondary system drains, floor drains, and other nonradioactive drains throughout TRA. Historically, only one of the two cells is used at a time, and flow of wastewater is alternated from one cell to another on an annual basis. Wastewater that is discharged into the Cold Waste Pond percolates through the soil to form the perched water zones beneath TRA. Effluent routed to the pond has been monitored for metals, organic compounds, and radionuclides since 1986. Soil samples were collected from the bottom of the two cells in 1990 (Figure 5-3) and analyzed for gamma-emitting radioisotopes, TCLP metals, and VOCs. Radionuclides, including Co-60, Cs-134, Cs-137, and Eu-154, were detected at concentrations slightly above INEEL background levels in several samples. These low levels of radionuclides were found in samples collected from the pond berms and are thought to be the result of windblown soil contamination from the Warm Waste Pond rather than from effluents discharged to the Cold Waste Pond. Low levels of VOCs (carbon tetrachloride, tetrachloroethylene, tetrahydrofuran, 1,1,1-trichloroethane, and xylene) and metals (arsenic, barium, cadmium, chromium, copper, lead, mercury, selenium, and silver) were also detected in the pond sediments.

In addition, in May 1996, sediment samples were collected from the Cold Waste Pond. Radionuclides, including Co-60, Cs-137, and Am-241, were detected at background or slightly above background concentrations. The results of this sampling effort can be found in the Administrative Record under the OU 2-13 Comprehensive RI/FS. Currently, a wastewater land application permit was submitted to the State of Idaho for review and approval in late January 1997.

5.2.1.4 *Sewage Leach Pond (TRA-13).* The Sewage Leach Pond is located outside the TRA facility fence and consists of two cells where effluent was discharged from sanitary sewer drains throughout TRA. The first cell (southern) was constructed in 1950 and the second (northern) in 1965. The system was routinely monitored by the Environmental Monitoring Unit beginning in 1986. Process knowledge indicates that effluent is limited to sewage. However, low-level gamma-emitting radionuclides were detected in the bottom of the 1950 cell, and alpha and gamma-emitting radionuclides were detected in a sludge pit located south of the Sewage Treatment Plant. The source of the contamination has been attributed to windblown sediments from the Warm Waste Pond. After a preliminary investigation, DOE-ID recommended that the bottom of the pond be backfilled when it was removed from service. IDHW and EPA concurred. Construction of a new sewage treatment facility, including a lined evaporation pond, was completed in December 1995, and the former Sewage Leach Pond and Sewage Treatment Plant were removed from service.

5.2.2 Subsurface Release Sites

Recent investigations have determined that RCRA-listed waste may have been present in the TRA warm and hot waste systems when leaks from the systems to the environment occurred. Therefore, soils at those sites associated with releases from the warm waste system or hot waste system will be managed in a manner consistent with the hazardous waste determination to be performed at the time of the remedial action.

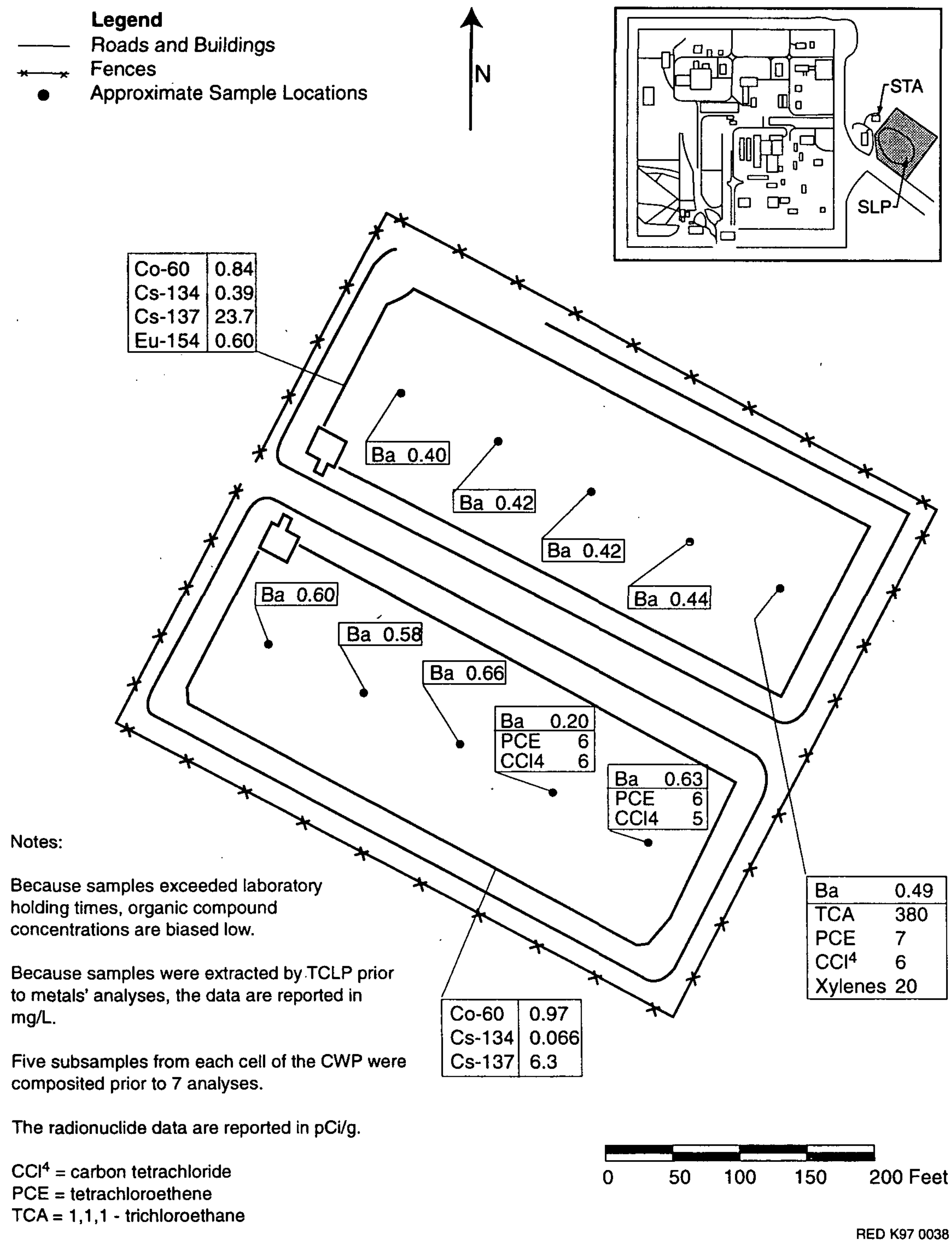


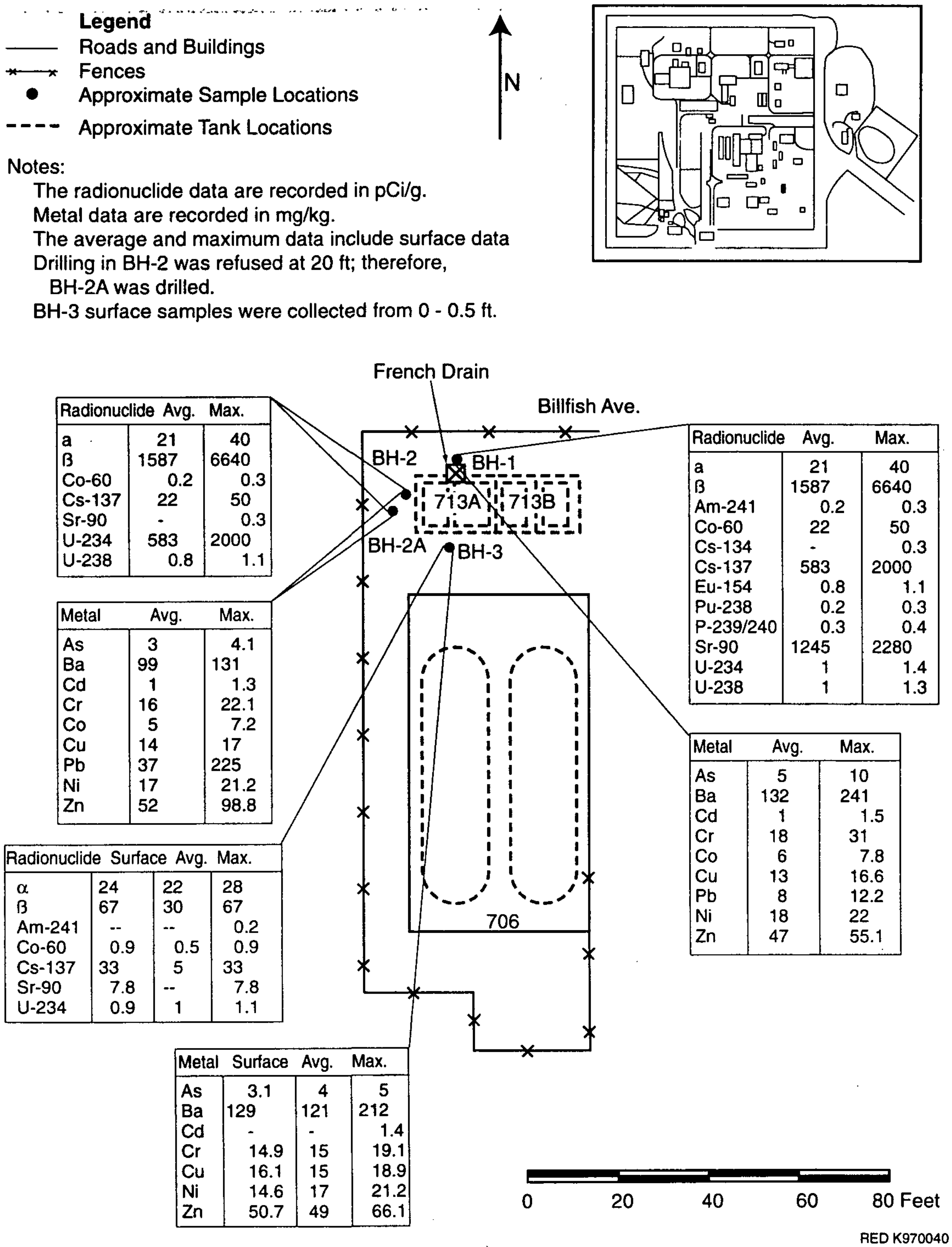
Figure 5-3. Cold Waste Pond (TRA-08) showing 1990 soil sample location, organic compound and metal data, and composite gamma data.

5.2.2.1 Soil Surrounding Hot Waste Tanks at Building TRA-613 (TRA-15). The TRA-15 site is the location of underground Tanks 1 and 2 that leaked radiologically contaminated and possibly hazardous waste to surrounding soil. Four underground tanks are located at this site. Leaks from Tank 1 were determined to be the source of subsurface contamination identified in the 1993–1994 time frame. Four borings were drilled from the surface to basalt to depths of 30 to 31 ft (~9.5 m), as shown in Figure 5-4. Samples collected from these borings show soil is contaminated with Sr-90 and Cs-137 at or below a depth of 20 ft (6 m). Surface spills and leaks were also reported, but a surface soil contamination assessment conducted in 1994 showed that only low levels of Cs-137 to a maximum of 8.3 pCi/g were detected. However, surface samples collected in 1993 from borehole No. 3 showed Cs-137 concentrations as high as 33 pCi/gm.

Lead was detected in all the samples and ranged from 4.9 to 225 mg/kg. Chromium was detected from 4.45 to 31 mg/kg, and arsenic was detected from 2.1 to 10 mg/kg. Sampling results indicate that volatile and semivolatile constituents were not detected at the site.

5.2.2.2 Soil Surrounding Tanks 1 and 2 at Building TRA-630 (TRA-19). The TRA-19 site (Figure 5-5) consists of subsurface soil contamination suspected of resulting from leaks from the radiologically contaminated waste drain line that originates at the Gamma Facility Building (TRA-641) or from possible releases from four underground catch tanks associated with the MTR. The original four catch tanks from the MTR were contained in a concrete vault. The tanks and vault were removed and replaced with new ones in 1985 and 1986. The original tanks were found to be intact upon removal and although the outside surface appeared to be degrading, the fiberglass liners had not been breached. Therefore, no releases from the tanks were suspected. Several spills inside the vault, however, had been reported as a result of pipe-cutting operations during tank removal, from reconnecting pipelines to the new tanks, and from a damaged waste drain line from Building TRA-641, but nothing was released to the soil that remained after the tank upgrade. Recently it has been determined that hazardous waste has been and are being contained in the hot waste catch tanks near the TRA-19 release site. This raises the concern regarding whether releases associated with the hot waste system (i.e., TRA-19, TRA-15, and the Brass Cap Site) were appropriately characterized given the probability of nonradionuclide hazardous constituents having been released and only radionuclide sampling analysis performed. To address this issue, the agencies agreed that TRA-15 could serve as a corollary for release sites associated with the Hot Waste System because more complete characterization was performed at TRA-15 (radionuclides, metals, volatile, and semivolatile organic compounds). However, the data collected would not be sufficient to fully support a hazardous waste determination at TRA-15, TRA-19, and Brass Cap Area given the present knowledge of other listed hazardous wastes that were not sampled/analyzed as part of the general investigation at TRA-15. Therefore, a hazardous waste determination will need to be completed when excavation and disposal occur and the soil managed accordingly.

Limited sampling conducted at TRA-19, information from field screening data collected during tank removal, and information from Health Physics Technician logs indicate that COCs in soil resulting from pipeline leaks are likely to include Co-60, Cs-134, Cs-137, and Sr-90. The contamination is suspected to be the result of a leak from the radiologically contaminated waste drain line that originates at the Gamma Facility Building (TRA-641) rather than the TRA-730 tanks or tank vault. Because the line is located at a depth of 8 ft (2.4 m), the contamination is suspected to extend below this depth. It should be noted that the Gamma Facility Building is no longer in use and is scheduled to undergo decontamination and decommissioning.



Radionuclide	Avg.	Max.
a	21	40
ß	1587	6640
Co-60	0.2	0.3
Cs-137	22	50
Sr-90	-	0.3
U-234	583	2000
U-238	0.8	1.1

Metal	Avg.	Max.
As	3	4.1
Ba	99	131
Cd	1	1.3
Cr	16	22.1
Co	5	7.2
Cu	14	17
Pb	37	225
Ni	17	21.2
Zn	52	98.8

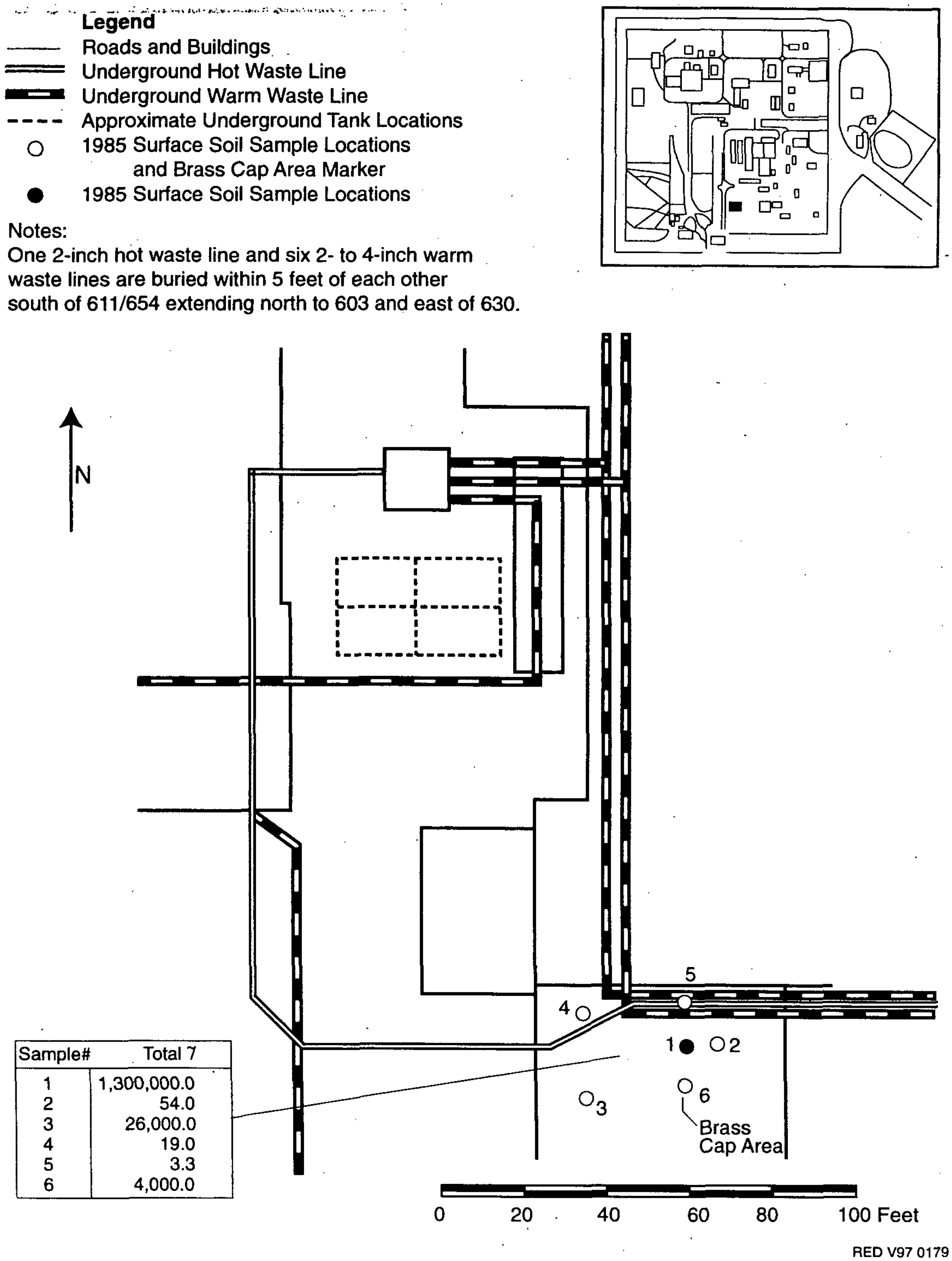
Radionuclide	Surface	Avg.	Max.
α	24	22	28
ß	67	30	67
Am-241	--	--	0.2
Co-60	0.9	0.5	0.9
Cs-137	33	5	33
Sr-90	7.8	--	7.8
U-234	0.9	1	1.1

Metal	Surface	Avg.	Max.
As	3.1	4	5
Ba	129	121	212
Cd	-	-	1.4
Cr	14.9	15	19.1
Cu	16.1	15	18.9
Ni	14.6	17	21.2
Zn	50.7	49	66.1

Radionuclide	Avg.	Max.
a	21	40
ß	1587	6640
Am-241	0.2	0.3
Co-60	22	50
Cs-134	-	0.3
Cs-137	583	2000
Eu-154	0.8	1.1
Pu-238	0.2	0.3
P-239/240	0.3	0.4
Sr-90	1245	2280
U-234	1	1.4
U-238	1	1.3

Metal	Avg.	Max.
As	5	10
Ba	132	241
Cd	1	1.5
Cr	18	31
Co	6	7.8
Cu	13	16.6
Pb	8	12.2
Ni	18	22
Zn	47	55.1

Figure 5-4. Hot Waste Tanks at Building 613 (TRA-15) showing 1993 soil boring locations and soil sample data.



Sample#	Total 7
1	1,300,000.0
2	54.0
3	26,000.0
4	19.0
5	3.3
6	4,000.0

Figure 5-5. Radioactive Tanks at Building 630 (TRA-19) and Brass Cap Area showing 1985 γ data in pCi/g.

5.2.2.3 Brass Cap Area. The Brass Cap Area is located in the center of TRA, near building TRA-630, and is southeast of site TRA-19 (see Figure 5-5). The contamination at this site is attributed to leaking warm waste lines. Following discovery of the contamination, the leaking waste line was repaired and contaminated soil associated with waste line repairs was removed. During removal of the contaminated soil, water collected in the bottom of the excavation. Actions included removing the soil and concrete in the area, identifying the leak, and repairing a pipeline elbow. The highest radiation levels were present directly above the elbow in the wasteline. Following the repair, the excavation was backfilled with clean soil and then resurfaced with concrete. The source of the water was determined to be a leaking warm waste line, located 5 ft (1.5 m) south and 5 to 6 ft (1.5 to 1.8 m) below the level of the excavation. The extent of migration of the radiological contamination under the concrete surface was characterized by boring six 8-inch-diameter holes through the concrete, followed by measurements using field screening instruments (intrinsic Germanium detector, multichannel analyzer, and tungsten collimator).

The extent of contamination in the excavation was determined by driving a hollow-pointed pipe into the ground at the bottom of the excavation and measuring the radiation inside the pipe. This survey indicated that the soil was contaminated to a depth of approximately 10 ft (3 m). Soil sample results from the excavation indicated that the radionuclide contaminants consist primarily of Cs-137 and Cs-134, with lesser amounts of Sr-90 and Co-60. Contaminant estimates at the Brass Cap Area are based on radiation measurements rather than direct soil sampling results. It is not known whether chemical contaminants exist at this site. Following the soil removal and leak repair, the excavation was backfilled with clean soil and resurfaced with new concrete. A brass marker (hence, the name Brass Cap Area) was placed in the concrete to designate the area of subsurface contamination.

5.2.3 Windblown Surficial Contamination Site

5.2.3.1 Sewage Leach Pond Berms and Soil Contamination Area. The soil contamination area (Figure 5-6) is a fence-enclosed radiation control area on the north and south sides of the Sewage Leach Pond. The fenced area is approximately 475 × 480 ft (145 × 147 m). Radiological contamination on the south side of the southern berm (Figure 5-7) is attributed to Warm Waste Pond sediments. However, radiological contamination on the north side of the southern berm may have resulted from windblown Sewage Leach Pond sediments and/or the Warm Waste Pond windblown sediments.

A sampling investigation was conducted in the summer of 1994 to characterize the radionuclide contamination in surface soil northeast and southwest of the Warm Waste Pond. Fifty samples were collected along transects, which included the area adjacent to the Sewage Leach Pond. The most frequently detected radionuclides were Cs-137, Co-60, and Sr-90. Interim action at Warm Waste Pond in 1993 included excavation and consolidation of the contaminated pond sediments, which were then covered with clean soil, thus eliminating the suspected source of the windblown surface soil contamination. During this interim action, a front-end loader was used to remove contaminated surface soil with instrument readings of over 100 counts per minute. No verification samples, however, were collected to confirm the effectiveness of this contamination removal activity at that time.

In 1995, additional sampling was conducted to characterize the surface soil contamination near the Sewage Leach Pond; this sampling confirmed a reduction in contamination. Surface soil samples were randomly collected from 18 locations on the southern berm and from 18 locations in the remainder of the soil contamination area. Cesium-137 was detected in all samples collected on the southern berm and is the COC that causes an unacceptable risk. Other isotopes detected in berm samples were Co-60, Ag-108m,

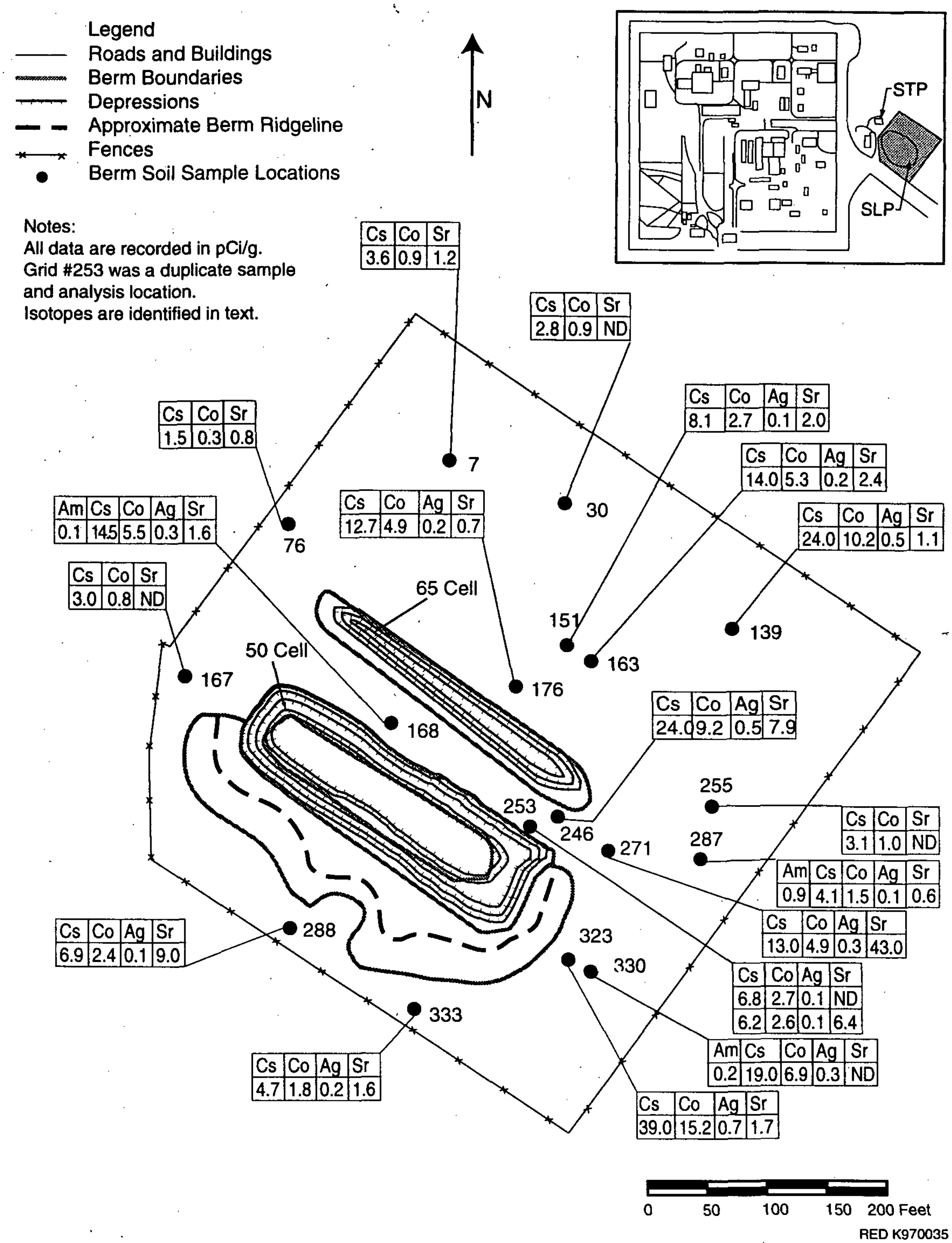


Figure 5-6. Sewage Leach Pond soil contamination area showing 1995 sampling locations and data.

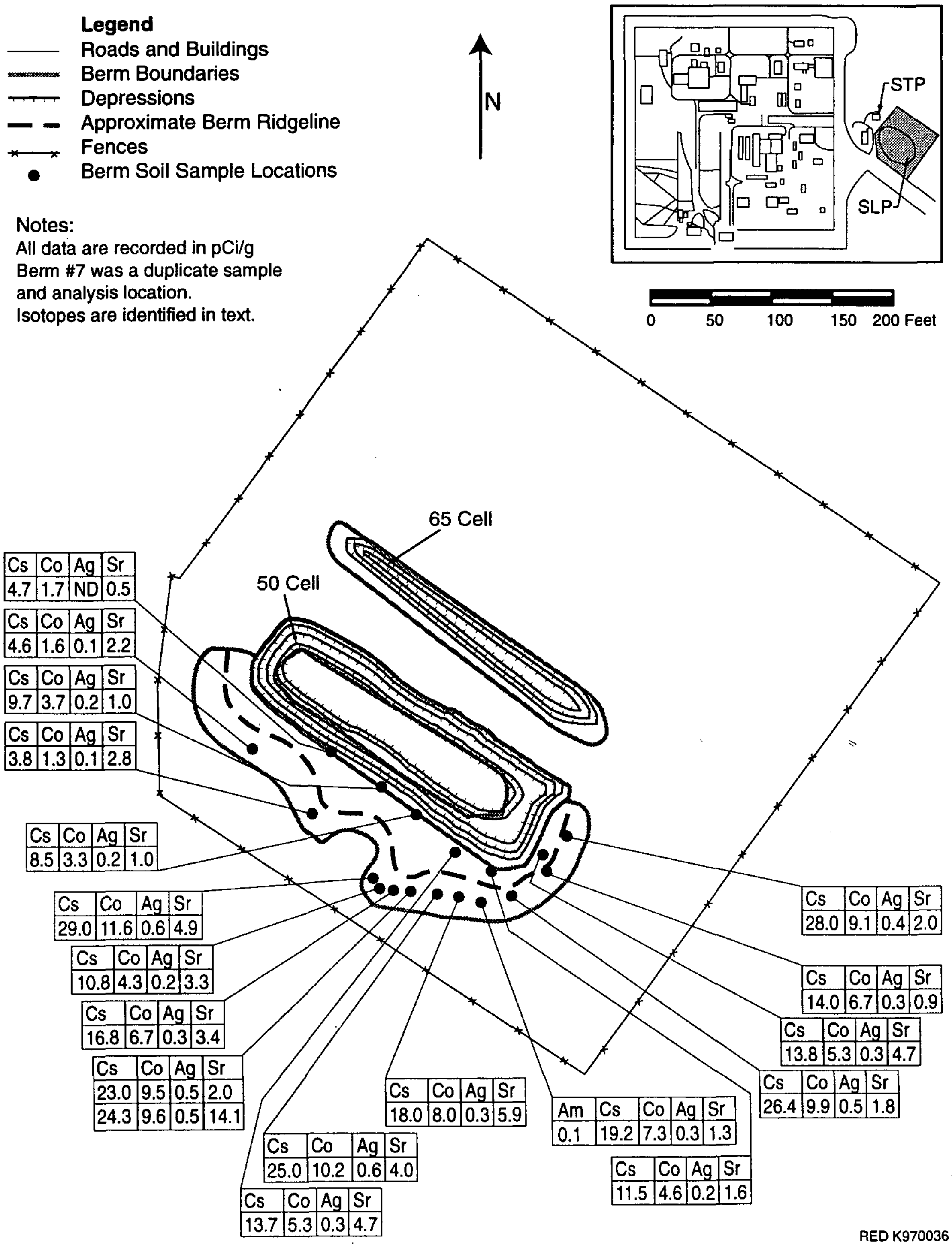


Figure 5-7. Sewage Leach Pond berms showing 1995 sampling locations and data.

and Am-241. Also detected were the metals silver, barium, beryllium, cadmium, chromium, copper, mercury, nickel, lead, and zinc. The SVOCs pyrene, fluoranthene, phthalates, chrysene, benzo(b)fluoranthene, and 4-chloroanaline were also present. All metals were detected at or below background concentrations. All SVOCs were nondetectable.

Samples from the remainder of the area had the same radionuclide contaminants, but at lower levels than found in the berm samples. The primary COCs are Co-60 and Cs-137. Levels of contamination, however, are below the preliminary remediation goal concentrations for radionuclides.

5.2.4 Snake River Plain Aquifer and Deep Perched Water System

Infiltration of water from the pond system at TRA has caused contaminant migration to the SRPA. A chromium plume with concentrations currently above maximum contaminant levels (100 μg/L) extends both south and southwest of TRA. A tritium-contaminated plume with concentrations currently above maximum contaminant level (MCLs) also exists, extending both south and southwest of TRA. Semiannual monitoring of these plumes continues. Computer modeling was conducted to determine the predicted contaminant levels in the future. Through radioactive decay (tritium), natural attenuation, and dispersion processes, contaminant levels in the SRPA are expected to be reduced to less than MCLs (100 μg/L) between the years 2004 and 2016. In order to evaluate the possibility of overlapping groundwater contaminant plumes with other areas, contaminant source terms from the TRA modeling effort are included in the OU 3-13 groundwater modeling effort at the Idaho Chemical Processing Plant.

The perched water zones underlying TRA are contaminated from infiltration of wastewaters from the system of ponds. An investigation of the two perched zones (shallow and deep) was conducted. The ROD for the TRA Perched Water System, OU 2-12, was issued in December 1992. It was determined in the ROD that no remedial action was necessary to ensure protection of human health and the environment. That decision was based on the results of human health and ecological risk assessments (ERAs), which determined that conditions at the site pose no unacceptable risks to human health or the environment for expected or future use of the SRPA beneath the deep perched water system at TRA. One of the assumptions for the no-remedial-action decision was that groundwater monitoring would be conducted to verify that contaminant concentration trends follow those predicted by a groundwater computer model. It was further stated that a statutory review of this decision would be conducted by the agencies within 3 years to ensure that adequate protection of human health and the environment continues to be provided.

A technical memorandum was prepared in August 1996 that presents the 3 years of post-ROD monitoring data and provides an evaluation of hydrologic and groundwater contaminant conditions for the TRA deep perched water system and the underlying aquifer (refer to Section 5.2.5.12 for more information regarding the results of the 3-year post-ROD monitoring). The agencies agree that the remedy selected for OU 2-12 continues to provide adequate protection of human health and the environment. Specific recommendations in the OU 2-12 3-year review include continued sampling at SRPA wells TRA-06 and TRA-08, replacement of positive displacement pumps in wells TRA-06 and -08 by submersible pumps, and sampling on a semiannual basis for both deep perched water system and SRPA wells. The SRPA wells will be sampled for total dissolved chromium and tritium semiannually and cadmium, Co-60, and Sr-90 annually; deep perched water system wells will be sampled for total dissolved chromium, tritium, cadmium, Co-60, and Sr-90 semiannually. The OU 2-12 ROD is a final ROD and stand-alone document.

A required monitoring plan will be developed following signature of this ROD. Monitoring performed in accordance with the OU 2-12 ROD will be integrated into the OU 2-13 post-ROD groundwater monitoring plan. The Warm Waste Pond and the Sewage Leach Pond have also been replaced by lined ponds, resulting in the elimination of a previous large source of contaminated effluent impacting the perched water zones. The impact of this source reduction will continue to be monitored.

5.2.5 No Action Sites

The agencies agree that no action will be taken under CERCLA at the sites discussed in the following sections. For those sites for which no action is being taken based on land use assumptions, those assumptions will be reviewed as part of the 5-year review.

5.2.5.1 Rubble Piles. Ten sites consisting of uncontaminated rubble piles were examined in the initial review of the TRA site. Because they contain no hazardous substances that would pose an unacceptable risk, they were given a No Action status in the FFA/CO and were not considered further in the RI/FS. Miscellaneous asbestos tiles were discovered and cleaned up from the rubble piles in 1996.

5.2.5.2 Paint Shop Ditch (OU 2-01). The Paint Shop Ditch is an open ditch that was used for disposal of paint-shop waste until 1982. The site has been characterized; concentrations of contaminants are below risk-based levels of concern. A determination of No Further Action for the site was approved by the agencies in December 1991.

5.2.5.3 Inactive Fuel Tank Sites (OU 2-02). This OU 2-02 site includes five underground storage tanks that contained petroleum products. All five of the tanks have been removed from the ground; the initial site characterizations found that either no, or minimal, contamination remained at the sites. The sites were all recommended and approved for No Further Action by the agencies in 1992 and 1993.

5.2.5.4 Miscellaneous (OU 2-03). This OU includes six miscellaneous sites where sources of contamination no longer exist. All sites in this OU received No Further Action determinations from the agencies in 1993. Following are summaries of those sites.

TRA-01 is a burial site containing excavated soil from a 1983 sulfuric acid spill. The acid in the soil was immediately neutralized at the spill site before excavation and burial. Bounding calculations show that the calcite content of the soil would be sufficient to neutralize more than 10 times the estimated release volume. As no source exists at the site, no further action is appropriate.

TRA-11 is a french drain connected to the overflow vent of a 1,000-gal (3,875-L) sulfuric acid tank. No documented overflows or evidence of spills is associated with the site. Risk-based calculations demonstrate that the threshold quantity of acid necessary to generate an unacceptable risk would have been appropriately documented. As no source likely exists at the site, no further action is appropriate.

TRA-12 is a site where, in 1983, an estimated 110 gal (416 L) of No. 5 fuel oil overflowed from a 200,000-gal (75,708-L) aboveground tank. Two independent eyewitnesses report that the flow never reached the ground (because of the high viscosity of the oil), and no ground staining was observed. Bounding calculations show that VOCs would not be present even if the spill volume was increased by a factor of ten. As no source exists at the site, no further action is appropriate.

TRA-20 is the site of a 15,000-gal (56,781-L) aboveground concrete tank used for processing sodium chloride solution, sodium hydroxide, and sulfuric acid. Before using the sodium hydroxide and sulfuric acid in the tank, it was lined with epoxy. The tank lining was found to be intact during a 1992 inspection. Bounding calculations show that the calcite present in 10 yd^3 of soil would be sufficient to neutralize at least 315 gal (1,192 L) of the acid. Risk-based calculations indicate that the threshold quantity of sulfuric acid [315 gal (1,192 L)] is greater than the amount likely to have been spilled. No further action is appropriate.

TRA-40 is the site of a 45-ft (13.7-m) concrete-lined trench containing piping for demineralizer solutions. A portion of the trench was unlined prior to 1989. Releases before 1984 would have involved nonhazardous substances. Subsequently, the system transferred sulfuric acid and sodium hydroxide. There are no documented releases from the site, and an inspection performed in 1992 indicated that the system was in a well maintained condition. Had a leak occurred, approximately equal volumes of acid and base would have been released. As no source exists at the site, no further action is appropriate.

TRA-614 is a site consisting of an earthen berm where small quantities of oil may have been disposed. There is no documentation or evidence of oil disposal at the site. The site is currently beneath Building TRA-628. With excavation of the berm, there is no known source. No further action is appropriate.

Based on these results, no further action is appropriate for all OU 2-03 sites.

5.2.5.5 Petroleum and PCB Spill Sites and North Storage Area, Including the Soil Contamination Area (OU 2-04). Sites recommended for No Further Action include seven sites of mainly petroleum products, including three with PCB-contaminated areas. The other four sites include diesel fuel contamination in a perched water well, contamination beneath an old loading dock, and two areas of fuel oil contamination. Also included in OU 2-04 is the North Storage Area, including the North Storage Area Soil Contamination Area where localized areas of radionuclide-contaminated soils exist. The agencies recommend no further action because potential concentration of contaminants and associated risks are below levels that would justify cleanup action or further investigation.

TRA-653 is the site of a PCB transformer spill. After excavation of 8 yd^3 of contaminated soil and backfilling with clean soil in 1990, the highest PCB concentration was found to be 16 ppm under 4 ft (1.2 m) of clean soil. The maximum surface concentration was 2 ppm located in a 2 × 8 ft (0.6 × 2.4 m) area that was not excavated. The use of a conservative computer screening model demonstrated that the concentration of PCB is below that necessary to pose a risk to groundwater. Although the concentration of PCB for the soil ingestion pathway is above the 1 in 1,000,000 concentration of 0.08 ppm for carcinogenic risk, it is below the 25 ppm cleanup level established under the Toxic Substances Control Act (TSCA) for restricted industrial areas. No further action is appropriate.

TRA-619 is the site of a PCB transformer spill. Approximately 10 to 12 yd^3 of soil were removed from around the transformer. The site was backfilled with approximately 2 ft (0.6 m) of clean soil. The highest PCB concentration of 22 ppm is below the 2 ft (0.6 m) of contaminated soil and the concrete pad, which was left in place. Although the concentration of PCB for the soil ingestion pathway is above the 1 in 1,000,000 concentration of 0.08 ppm for carcinogenic risk, it is well below the 25 ppm cleanup level established under TSCA for restricted industrial areas, and is under at least 2 ft (0.6 m) of clean soil. No further action is appropriate for this site. Note that this site description was inadvertently left out of the list of No Action site descriptions in the Proposed Plan.

TRA-626 is the site of a PCB transformer spill. Approximately 36 yd^3 of soil and concrete were excavated from the site, followed by backfilling with clean soil. The highest PCB concentration is 24 ppm under 4 ft (1.2 m) of clean soil. Computer model results demonstrate that the concentration of PCB is below that necessary to pose a risk to groundwater. Although the concentration of PCB for the soil ingestion pathway is above the 1 in 1,000,000 concentration of 0.08 ppm for carcinogenic risk, it is below the 25 ppm cleanup level established under TSCA for restricted industrial areas, and is under 4 ft (1.2 m) of clean soil. No further action is appropriate.

PW-13 is a monitoring well site where diesel fuel was discovered at a depth of 65 to 75 ft (20 to 23 m) during drilling operations. After removing approximately 20 gal (76 L) of diesel fuel, the borehole was observed for several days without additional influx of fuel being noted. The well was subsequently completed at a depth of 90 ft (27 m). The well has been sampled four times (July 1993, October 1993, January 1994, and April 1994) and analyzed for total petroleum hydrocarbons. The well was sampled and analyzed twice for benzene, toluene, ethylbenzene, and xylene. All analyses were reported as nondetects, with the exception of ethylbenzene, which was detected in samples at concentrations ranging from nondetect (April 1994) to a high of 5.41 ppb (July 1993). These levels are well below the allowable drinking water MCL of 700 ppb.

TRA-09 is the site of a former loading dock used to store petroleum products and solvents where, as a result of transfer operations, small quantities of this material may have been spilled. Bounding calculations performed demonstrated that the hazardous constituents from small incidental spills would have volatilized in the 8 years since the dock was removed. Soil staining observed in 1985 when the dock was removed is no longer visible, qualitatively indicating natural degradation of the spill constituents.

TRA-670 is the site of surficial oil staining at the former location of two 500-gal (1,893-L) aboveground waste oil storage tanks. Anecdotal information indicates that the tanks had been overfilled on at least one occasion and that small incidental spills would occur during routine transfer operations. The tanks and stained soil were removed from the site in 1987, and the area was backfilled with clean soil. It is unlikely that sufficient contamination remains at this location to pose an unacceptable risk.

TRA-627 is the site of oil-stained soils at an oil transfer pump house. The pump house was used to transfer No. 5 fuel oil from trucks to storage tanks. Incidental spills occurred during the transfer as lines were connected and disconnected. Whenever these spills occurred, however, it was standard practice to use a sand absorbent on the spill. The sand was then put into a "sand box" before disposal at the Central Facilities Area landfill. The only hazardous constituents of No. 5 fuel oil are low levels of polycyclic aromatic hydrocarbons. The high viscosity of No. 5 fuel oil would have prevented significant infiltration prior to removal of the spills.

The North Storage Area, including North Storage Area Soil Contamination Area located north of the North Storage Area fence, contained localized radionuclide-contaminated soil. This soil contamination area was removed in the summers of 1995 and 1996 as part of an INEEL-wide cleanup of radioactively contaminated surface soil. Confirmation samples show that removal of this contamination was effective. No further cleanup action is necessary, and the No Action option is appropriate.

5.2.5.6 Hot Waste Tanks (OU 2-05). This OU contains two tank sites (TRA-16 and TRA-603/605) used for hot waste disposal. Site TRA-16 was an underground hot waste storage tank. The contents of the tank were sampled in April 1993 and found to be an ignitable waste contaminated with low levels of radionuclides, primarily uranium isotopes. The tank contents were removed, and the tank was excavated in August 1993. Note that no leaks were detected and the tank was intact upon inspection when it was removed. The risk evaluation of the site found no unacceptable risk from exposure through any complete pathway. At the TRA 603/605 tank, there had been no evidence of leaks. It is unlikely that a source of contamination remains at the site. The process water pipe loop is constructed of 0.25-in. (0.64-cm) stainless steel and is unlikely to have lost sufficient integrity to allow leakage. In addition, any leaks would be collected in a sump within the building where the portion of the loop being used for storage is located. There have been no reports of leaks. It is unlikely that there is a source of contamination at this site. The agencies concurred in 1994 that no further action is necessary for these two tank sites.

5.2.5.7 Rubble Sites (OU 2-06). This OU 2-06 site consists of three separate rubble piles, which were generated as a result of previous construction activities at the TRA. These piles are located outside the existing fenced perimeter and were used intermittently from 1952 through 1971. No source of hazardous waste contamination exists at any of the three sites; therefore, no complete pathways were identified. After a limited investigation, the agencies concurred in October 1993 that no further action is necessary at these three sites. Historical data, including photographs, information from operations personnel, and field screening data obtained during site visits provided the basis for this evaluation.

5.2.5.8 Cooling Tower Sites (OU 2-07). This OU consists of areas surrounding the cooling tower basins and cooling towers associated with the ETR, MTR, and ATR. The sites were suspected of being contaminated with hexavalent chromium. However, the majority of chromium detected in the soil had been reduced to the less toxic trivalent state and is in the elemental state. Risk evaluations conducted for current occupational and future residential scenarios indicated that the potential risk for all pathways and all scenarios does not exceed 1 chance in 1,000,000. Based on these results, DOE-ID recommended, and the EPA and IDHW concurred, that no further action is appropriate.

5.2.5.9 Materials Test Reactor Canal (OU 2-08). For approximately 8 years, the canal, installed in 1952, leaked significant quantities of water contaminated with radionuclides. During an investigation in 1994, historical data (including operating procedures), monitoring data, and information from site personnel were collected and evaluated. Potential contaminants in the subsurface are available for release only to the groundwater pathway, as the base of the canal is 14 to 32 ft (4 to 10 m) below ground level.

The groundwater pathway was evaluated using a conservative computer screening model. The results of the modeling indicate that the COCs (cadmium, beryllium, cesium, and cobalt) are relatively immobile, based on their respective computed travel times to the underlying aquifer. In addition, the potential for contaminant migration from moisture infiltration is limited by the fact that the major portion of the canal is located below the MTR building and the portion that extends beyond the building is under pavement. Based on this information, the risk to human health and the environment to exposure by contaminants in the canal is considered low. DOE-ID recommended, and EPA and IDHW concurred, that no further action is appropriate for this site.

5.2.5.10 Sewage Treatment Plant (OU 2-09). Because there is no evidence of a release of a hazardous material, this site was determined to require no further action.

5.2.5.11 Retention Basin, Injection Well, Cold Waste Sump and Pit (OU 2-11). The warm waste retention basin is a large underground concrete basin. The retention basin received the waste routed to the Warm Waste Pond. It was originally designed to hold radioactive wastewater long enough for short-lived radionuclides to decay. The disposal well sampling pit, and sump system located south of the retention basin, were used for the disposal of uncontaminated cooling tower effluent water between 1964 and 1982. The site was evaluated in 1992, and it was determined that the well (TRA-05) sump and sampling pit do not pose an unacceptable risk. Radiological and chemical soil contamination was identified surrounding the warm waste retention basin from releases associated with the basin, piping, and sumps. The results of the OU 2-13 comprehensive baseline risk assessment indicate that the risks associated with the site are within allowable levels. The recommendation from the agencies for these sites is that no further action is appropriate.

5.2.5.12 Perched Water (OU 2-12). This OU comprises the perched water zones underlying the TRA. These zones are a result of water from the Cold Waste Pond, Warm Waste Pond, Chemical Waste Pond, and Sewage Leach Pond infiltrating the ground and perching on low permeability layers (i.e., silts and clays) in the underlying basalt. The investigation of the shallow and deep perched water zones was completed in 1992, and a ROD was signed in December 1992, recommending long-term monitoring and evaluation of monitoring results. After 3 years of post-ROD monitoring, chromium and tritium concentrations in two of the SRPA monitoring wells remain above drinking water standards. However, insufficient data have been collected to determine the statistical significance of these results. Overall, good agreement between actual and expected concentrations for other contaminants exists on the basis of the 3 years of study since the OU 2-12 ROD was signed. The Deep Perched Water System wells show that removing the Warm Waste Pond from service has reduced contaminant concentrations with time. In general, all monitoring wells show a decreasing contaminant concentration trend, with the exception of one well with chromium (USGS-53) and one well with tritium (USGS-58) that shows an increasing trend with time. The extent of detectable contaminant plumes originating at TRA appears to be less than 5 km, based on United States Geological Survey (USGS) monitoring of the public rest stop well on U.S. Highway 20. Continued monitoring of the SRPA and the perched water below the TRA is recommended.

5.2.5.13 New Sites (OU 2-13). **Hot Tree Site**—The Hot Tree Site is located in the center of TRA. Screening of the branches of a spruce tree indicated it was contaminated with gamma-emitting radionuclides. The tree was removed, boxed, and disposed in May 1994. Subsequent to the removal of the tree, ten shallow soil boring samples were collected for field screening. The samples were collected approximately 2 ft (0.6 m) below land surface in the immediate area surrounding the former tree location, and the tree's root system was surveyed. In addition, three surface soil samples were collected and submitted for analysis. The highest radiologically contaminated areas were located west of the Hot Tree Site, suggesting that a nearby abandoned warm waste line was the contamination source. Adjacent trees were surface screened in August 1994. The surface screening of adjacent trees did not indicate contamination. Surface radiation surveys of the Hot Tree Site indicated a radiation dose rate of 30 to 40 μrem/hr at waist height (i.e., TRA background levels). This suggests that the contamination was confined to the Hot Tree Site.

The warm waste line, which is the suspected contamination source, is located approximately 10 ft (3 m) west and 6 ft (1.8 m) below land surface of the removed tree. The waste transferred through this line was low-pressure, demineralized acidic water. The acidic condition of the waste could have contributed to the deterioration of the line, which could lead to potential releases. The line was cut and capped in 1983, so it is not suspected to be a potential source of continuing releases.

Because only Cs-137 was detected in two 1994 surface soil samples, it is the only COPC. Based on the Hot Tree Site, sampling information by TRA facility personnel, and process knowledge of the warm waste line, only gamma-emitting radionuclides Cs-137 and Co-60, and the beta-emitting radionuclide Sr-90, were identified as COPCs at the Hot Tree Site.

Additional sampling was conducted to better characterize the subsurface contamination profile. The results of this sampling effort were evaluated in the baseline risk assessment. The baseline risk assessment showed that an unacceptable risk does not exist at this site because of low contaminant concentrations in the soil. No further action is necessary for this site.

Engineering Test Reactor Stack—The Engineering Test Reactor Stack is located outside and east of the TRA perimeter fence and west of the Warm Waste Pond. The site was suspected to have PCB contamination because tar-containing PCBs were used to coat the inside of the stack. This tar coating had deteriorated since 1957, when the stack was put in operation, and started to leak out the north access door at the base of the stack. Because of this process knowledge, no other COPCs are associated with this site. In addition, samples collected by the facility indicated low levels of PCBs in the soil immediately adjacent to the concrete pad where the stack was located.

Three soil/concrete samples and one duplicate were collected from the soil at the base of the stack. Analysis of the samples indicates that very low levels of PCB contamination are present at this site. The maximum concentration was 2.3 ppm of the Aroclor-1260 PCB in one sample. The TSCA requires cleanup of PCB-contaminated soils at an industrial site if the PCB concentration is 25 ppm or higher. Because the maximum concentration detected was 2.3 ppm, cleanup is not required. No further action is necessary.

French Drain Associated with TRA-653 (TRA-41)—The French Drain is located in the south central portion of TRA. The French Drain comprises an 8-in. (20-cm) conduit extending from ground surface to approximately 2 ft (0.6 m) below land surface. This French Drain is still in place and operational. It is reported to the State of Idaho on the active injection well inventory. Process knowledge indicates that VOCs and SVOCs are the only COCs. Sampling was conducted at the French Drain in August 1993 during a Site-wide assessment of shallow injection wells. The material sampled was a sludge with a black tar-like appearance. The analytical data indicated that this new site had probably been contaminated by the TRA-653 mechanical shop operations. The wastes suspected are solvents, fuel residues, and oily wastes. The composite sample result was sufficient to characterize the sludge material.

A TRA facility maintenance action was completed in 1995 to remove sludge inside the drain. Approximately two 55-gal (208-L) drums of material were removed from the drain during the maintenance action. Confirmation sampling was conducted following removal of the sludge to verify total contamination removal. This material was characterized in August 1995 and was determined to be nonhazardous. Following this determination, the drums were dispositioned at the Central Facilities Area landfill. The results of the baseline risk assessment indicate that an unacceptable risk is not posed by this site. No further action is recommended.

Diesel Unloading Pit (TRA-42)—The diesel unloading pit is located in the northeast corner of the Test Reactor Area. The unloading pit for No. 2 diesel consists of a 4-in. (10-cm) flow line encased in an approximately 3- × 3- × 8-ft (1- × 1- × 2.4-m) concrete vault. The connection has been used since the late 1950s. Over the years, the unloading operations have resulted in minor releases into the bottom of the pit.

When the pit was cleaned, it was discovered that the pit had an unlined soil and sand floor, not a concrete floor as expected. Any diesel spills may have penetrated the surface soil of the pit surrounding the connection.

No additional field characterization was conducted. A conservative estimate of the volume of diesel fuel that may have been spilled at the site indicates that the volume is insufficient to migrate to groundwater using the computer model. In addition, the computer model indicated that the potential residual concentration of benzene that might be leached into the groundwater is insufficient to pose a risk for groundwater consumption. This site was eliminated from further evaluation on the basis that a source of contamination is no longer present that would pose an unacceptable risk. No further action is necessary.

6. SUMMARY OF SITE RISKS

6.1 Human Health Risk Evaluation

The human health risk assessment consists of two broad phases of analysis: (1) a site and contaminant screening that identified COPCs at retained sites, and (2) an exposure route analysis for each COPC. The exposure route analysis includes an exposure assessment, a toxicity assessment, and a risk characterization discussion. The OU 2-13 baseline risk assessment includes an evaluation of human health risks associated with exposure to contaminants through soil ingestion, fugitive dust inhalation, volatile inhalation, external radiation exposure, groundwater ingestion, ingestion of homegrown produce, dermal absorption of groundwater, and inhalation of water vapors because of indoor water use.

6.1.1 Contaminant Identification

Historical sampling data were used to identify contaminants present in surface soils at the WAG 2 sites. The list of contaminants was screened based on comparison with background concentrations determined for the INEEL, detection frequency of less than 5% and no evidence that the contaminant was released at the site, and whether the contaminant is routinely considered to be an essential nutrient. Because substances that are essential nutrients can be toxic at high concentrations, this screening step applied only at sites where essential nutrient concentrations are less than 10 times the background concentration.

In addition, an evaluation of groundwater concentrations was conducted to ensure that contaminants that have been detected above MCLs or risk-based concentrations were not eliminated from evaluation.

6.1.2 Exposure Assessment

The human health exposure assessment quantifies the receptor intake of COCs for select pathways. The assessment consists of estimating the magnitude, frequency, duration, and exposure route of chemicals to humans.

6.1.2.1 Exposure Scenarios. Only those exposure pathways deemed to be complete, or where a plausible route of exposure can be demonstrated from the site to an individual, were quantitatively evaluated in the risk assessment. The populations at risk because of the exposure from waste at the TRA were identified by considering both the current and future land use scenarios.

The residential scenarios model a person living on the site 350 days a year for 30 years, beginning in 2097 (100 years from 1997), and 2997 (1,000 years from 1997). The 100-year residential scenario was selected for analysis because the INEEL institutional control is currently expected to last for at least 100 years. The 1,000-year residential scenario was evaluated because 1,000 years is a sufficient period of time to allow for decay of the short half-life radionuclides at WAG 2. For purposes of the baseline risk assessment, the assumption was made that future residents will construct 10-ft basements beneath their homes, and so could be exposed to contaminants down to that depth.

The occupational scenarios model nonintrusive daily industrial use without restrictions. The two occupational scenarios that were analyzed include a current occupational scenario that lasts for 25 years from the present and a future occupational scenario that starts in 30 years and lasts for 25 years.

6.1.2.2 Quantification of Exposure. The following exposure pathways were considered applicable to the evaluation of human exposure to contaminants at the TRA sites: ingestion of soil, inhalation of fugitive dust, inhalation of volatiles, external radiation exposure, groundwater ingestion (residential scenario only), ingestion of homegrown produce (residential scenario only), and inhalation of volatiles from indoor use of groundwater (residential use only). Dermal absorption risks and hazard quotients for organic contaminants contained in WAG 2 soils were calculated at all of the retained release sites evaluated in the baseline risk assessment. It was determined that dermal exposure did not contribute significantly to risk based on these calculations and combined with the knowledge that the predominant contaminants of concern at TRA (i.e., radionuclides) are not dermally absorbed to any great extent.

Adult exposures were evaluated for all scenarios and pathways (external exposure; inhalation of dust; and ingestion of soil, groundwater, and foods); child exposures (0 to 6 years old) were considered separately only for the soils ingestion pathways in the residential scenarios. Children were included because children ingest more soil than adults, significantly increasing their exposure rate.

The exposure parameters used in the risk assessment were obtained from EPA and DOE guidance. The exposure parameter default values used in the risk assessment are designed to estimate the reasonable maximum exposure at a site. Use of this approach makes under-estimation of the actual cancer risk highly unlikely. The exposure parameters used in the risk assessment were:

- All pathways

- Exposure frequency, residential	350 days/yr
- Exposure frequency, occupational, current	250 days/yr
- Exposure duration, occupational, current	25 yr

- External exposure pathway

- Exposure time, residential	24 hr/day
- Exposure time, occupational	8 hr/day
- Exposure duration, residential	30 yr

- Soil ingestion pathway

- Soil ingestion rate, residential, adult	100 mg/day
- Soil ingestion rate, residential, child	200 mg/day
- Soil ingestion rate, occupational	50 mg/day
- Exposure duration, residential, adult	24 yr
- Exposure duration, residential, child	6 yr

- Dust inhalation pathway

- Inhalation rate	20 m^3 of air/day
- Exposure duration, residential	30 yr

- Groundwater ingestion pathway

- Groundwater ingestion rate, residential	2 L/day
- Exposure duration, residential	30 yr

The contaminant exposure point concentrations evaluated in the Baseline Risk Assessment were developed from site-specific sampling information. Ninety-five percent upper confidence level (UCL)

(95% UCL) of the mean concentrations were calculated from these sampling data, and either the 95% UCL or maximum detected concentration at a given site was used as the exposure point concentration in the site's risk calculations. This analysis method was also designed to produce reasonable maximum exposure estimates for the WAG.

6.1.3 Toxicity Assessment

A toxicity assessment was conducted to identify potential adverse effects to humans from contaminants at the TRA. A toxicity value is the numerical expression of the substance dose-response relationship used in the risk assessment. Toxicity values (slope factors and reference doses) for the sites were obtained from EPA's Integrated Risk Information System (IRIS) database and EPA's *Health Effects Assessment Summary Tables: Annual FY-93*, ECAO-CIN-909, 1993.

6.1.4 Human Health Risk Characterization

Excess lifetime cancer risks are estimated by multiplying the intake level, developed using the exposure assumptions, by the slope factor. These risks are probabilities that are generally expressed in either scientific notation (1×10^{-6}) or exponential notation (1E-06). An excess lifetime cancer risk of 1E-06 indicates that, a plausible upper bound, an individual has a one in one million chance of developing cancer over a lifetime as a result of site-related exposure to a carcinogen under the specific exposure conditions at a site. Excess cancer risks estimated below 1E-06 typically indicate that no further action is appropriate. Risks estimated in the range of 1E-04 to 1E-06 indicate that further investigation or remediation may be needed, and risks estimated above the 1E-04 typically indicate that further action is appropriate. However, the upper boundary of the risk range is not a discrete line at 1E-04, although EPA generally uses 1E-04 in making risk management decisions. A specific risk estimate around 1E-04 may be considered acceptable if justified based on site-specific conditions.

Tables 6-1 and 6-2 summarize the results of the human health evaluation with respect to the evaluated exposure routes. Table 6-1 indicates which release sites evaluated in the baseline risk assessment have predicted risks in excess of 1E-04 during the occupational 0-year or 30-year time periods, or the residential 100-year or 1,000-year time periods. Risk results are time dependent because of radioactive decay without physical source depletion. The results from the 30-year residential time period are not included because TRA is not expected to be released for residential development any sooner than 100 years in the future. Finally, Table 6-3 indicates the three sites (Chemical Waste Pond, Cold Waste Pond, and Sewage Leach Pond) with a predicted hazard index greater than one. As shown in these tables, the exposure routes that could produce unacceptable risks and hazard indexes are external radiation exposure, ingestion of soil, ingestion of homegrown produce, and inhalation of fugitive dust. Table 6-4 provides a summary of sites that pose an unacceptable risk to ecological receptors.

The contaminants with the greatest potential for causing adverse human health effects at WAG 2 (i.e., risks greater than 1E-04 or hazard index greater than 1.0) include four radionuclides and four metals. In general, radionuclide contamination in shallow soils represents the greatest health risk identified at the WAG. The contaminants with calculated risks greater than 1E-06 and/or calculated hazard indexes greater than 1.0 are considered to be COCs for WAG 2. These are shown in Table 6-5. Tables 6-6 and 6-7 list sites determined to present risks greater than 1E-04 or a hazard index greater than 1, respectively, for one or more exposure scenarios.

Table 6-1. Summary of sites and exposure routes with calculated risks greater than or equal to 1E-04.

	Occupational Scenario					Residential Scenario					
	Soil		Air			Soil			Air		
Submit	Ingestion of Soil	External Radiation Exposure	Inhalation of Fugitive Dust	Inhalation of Volatiles	Cumulative Total	Ingestion of Soil	External Radiation Exposure	Ingestion of Home Grown Produce	Inhalation of Fugitive Dust	Inhalation of Volatiles	Cumulative Total[a]
TRA-15		●			●		○				○
TRA-19	○	●			●		○				○
TRA-08 (CWP[b])		○			○	●					●
TRA-13 (SLP[c])		●			●		○				○
SLP-Berm ad SCA[d]		○			○		○				○
	○	○			●	○	○				●
TRA-03 (WWP[e] 1964 cell)		●									
Brass Cap Area	○	●			●		○				○

a. Includes risks for groundwater scenarios (ingestion, dermal absorption, and inhalation of vapors from indoor use).

b. CWP = Cold Waste Pond.

c. SLP = Sewage Leach Pond.

d. SCA = Soil Contamination Area.

e. WWP = Warm Waste Pond.

● Risk greater than or equal to 1E-04 by exposure route for the occupational scenario (both the present time and 30 years in the future) and for the residential scenario (both 100 years and 1,000 years into the future).

○ Risk greater than or equal to 1E-04 for the earlier time periods (occupational scenario at the present time or residential scenario 100 years in the future), and less than 1E-06 for the later period (occupational at 30 years into the future or 1,000 years into the future).

Table 6-2. Summary of sites and exposure routes with calculated risks greater than or equal to 1E-06.

	Occupational Scenario					Residential Scenario					
	Soil		Air			Soil			Air		
Subunit	Ingestion of soil	External radiation exposure	Inhalation of fugitive dust	Inhalation of volatiles	Cumulative Total	Ingestion of soil	External radiation exposure	Ingestion of homegrown produce	Inhalation of fugitive dust	Inhalation of volatiles	Cumulative Total[a]
TRA-34 (NSA[b])		●			●		○				●
TRA-619 (PCB spill)						●		●			●
TRA-626 (PCB spill)						●		●			●
TRA-653 (PCB spill)	●				●	●		●			●
TRA-15	●	●			●	●	●	○			●
TRA-16											●
TRA-19	●	●			●	○	○	○			●
TRA-08 (CWP[c])	●	●			●	●	○	●			●
TRA-13 (Sewage Leach Pond)		●			●		●				●
SLP[d]-Berm and SCA[e]		●			●		○				●
TRA-03 (WWP[f] 1952 and 1957 cells)	●	●			●	●	●	●			●
TRA-03 (WWP 1964 cell)											●
TRA-04 (Ret. Basin)	●	●			●	●	●	●			●
TRA-06 (CP[g])	●				●	●		●			●
Brass Cap Area	●	●			●	○	○	○			●
TRA-41 (French Drain)											●
HTS		●			●		○				●

Table 6-2. (continued).

	Occupational Scenario					Residential Scenario					
	Soil		Air			Soil			Air		
Subunit	Ingestion of soil	External radiation exposure	Inhalation of fugitive dust	Inhalation of volatiles	Cumulative Total	Ingestion of soil	External radiation exposure	Ingestion of homegrown produce	Inhalation of fugitive dust	Inhalation of volatiles	Cumulative Total[a]
ETR Stack	•				•	•		•			•

a. Includes risks for groundwater scenarios (ingestion, dermal absorption, and inhalation of vapors from indoor use).

b. NSA = North Storage Area.

c. CWP = Cold Waste Pond.

d. SLP = Sewage Leach Pond.

e. SCA = Soil Contamination Area.

f. WWP = Warm Waste Pond.

g. CP = Chemical Waste Pond.

• Risk greater than or equal to 1E-06 for both exposure scenario time periods (occupational 0-year and 30-year, or residential 100-year and 1,000-year).

o Risk greater than or equal to 1E-06 for earlier time period (occupational 0-year or residential 100-year), and less than 1E-06 for later period (occupational 30-year or residential 1,000-year).

Table 6-3. Summary of sites and exposure routes with calculated hazard index greater than or equal to one.

	Occupational Scenario					Residential Scenario					
	Soil		Air			Soil			Air		
Submit	Ingestion of Soil	External Radiation Exposure	Inhalation of Fugitive Dust	Inhalation of Volatiles	Cumulative Total	Ingestion of Soil	External Radiation Exposure	Ingestion of Home Grown Produce	Inhalation of Fugitive Dust	Inhalation of Volatiles	Cumulative Total[a]
TRA-08 (CWP[b])									•		
TRA-1[illegible] (SLP[c])								•	•		
TRA-06 (CP[d])						•		•	•		

a. Includes risks for groundwater scenarios (ingestion, dermal absorption, and inhalation of vapors from indoor use).

b. CWP = Cold Waste Pond.

c. SLP = Sewage Leach Pond.

d. CP = Chemical Waste Pond.

• Hazard index greater than one by exposure route for the occupational scenario (both the present and 30 years into the future), and for the residential scenario (both the 100 years and 1,000 years into the future).

Table 6-4. Summary of the sites that have the potential to pose an unacceptable risk to ecological receptors.

Site	Nonradionuclides		Radionuclides	
	Metal	Organic Compound	Internal	External
TRA-02[a]	●[b]	●[b]		
TRA-03	●[c]		●[c]	
TRA-04/05[a]	●[d]	●[d]		
TRA-06	●[e]			
TRA-08[a]	●[f]			
TRA-13[a]	●[g]			
TRA-15[a]	●[h]			
TRA-16[a]	●[i]			
TRA-19[a]			●[j]	●[j]
TRA-36	●[k]			
TRA-38[a]	●[l]			
Brass Cap Area[a]			●[j]	●[j]

a. Co-located facilities that are currently in use and/or near areas of industrial activity.

b. At TRA-02, the metals are antimony, lead, selenium, silver, thallium, and tin. The organic compound is benzo(b)fluroanthene.

c. At TRA-03, the metal is mercury and the radionuclides are americium-241, curium-244, plutonium-238, plutonium-239/240, and strontium-90.

d. At TRA-04/05, the metals are arsenic, copper, lead, mercury, selenium, and thallium; the organic compound is acrylonitrile.

e. At TRA-06, the metals are antimony, arsenic, barium, lead, mercury, selenium, silver, strontium, thallium, and tin.

f. At TRA-08, the metals are arsenic, barium, cadmium, copper, lead, mercury, selenium, and silver.

g. At TRA-13, the metals are copper, lead, mercury, selenium, silver, and zinc.

h. At TRA-15, the metals are arsenic, fluoride, and mercury.

i. At TRA-16, the metal is mercury.

j. At TRA-19 and the Brass Cap Area, the internal and external radionuclides are cesium-134 and cesium-137.

k. At TRA-36, the metal is selenium. (Cadmium and zinc also had hazard quotients >1; however, these contaminants would pose risk at background levels and are not considered a problem at this site.)

l. At TRA-38, the metals are antimony, arsenic, lead, mercury, selenium, and thallium.

Table 6-5. WAG 2 contaminants of concern.

Exposure Scenario	Radionuclides	Metals	Organic Contaminants	Other
Occupational	Ag-108m, Co-60, Cs-134, Cs-137, Eu-152, Eu-154, Sr-90	Arsenic	None	PCBs
Residential	Ag-108m, Am-241, Cs-134, Cs-137, Co-60, Pu-238, Pu-239, Sr-90, Th-228, U-238	Arsenic, beryllium, chromium, mercury	Acrylonitrile	PCBs

Table 6-6. Contaminants and exposure pathways of concern for OU 2-13 sites with risks >1E-06 and cumulative risks >1E-04.[a]

Site/Exposure Scenario	Pathway	Contaminants of Concern	Excess Cancer Risk
TRA-03 (Warm Waste Pond)			
Occupational 0-year	Soil ingestion	Am-241	2E-05
		Cs-137	2E-05
		Pu-238	1E-06
		Pu-239/240	2E-05
		Sr-90	4E-05
	External radiation exposure	Ag-108m	3E-05
		Am-241	4E-06
		Co-60	9E-04
		Cs-137	2E-02
		Eu-152	2E-03
		Eu-154	5E-04
	Exposure scenario total		**2E-02**
Occupational 30-year	Soil ingestion	Am-241	2E-05
		Cs-137	8E-06
		Pu-238	1E-06
		Pu-239/240	2E-05
		Sr-90	2E-05
	External radiation exposure	Ag-108m	2E-05
		Am-241	4E-06
		Co-60	2E-05
		Cs-137	1E-02
		Eu-152	5E-04
		Eu-154	4E-05
	Exposure scenario total		**1E-02**
Residential 100-year	Soil ingestion	As	5E-06
		Am-241	5E-05
		Cs-137	6E-06
		Pu-238	2E-06
		Pu-239/240	7E-05
		Sr-90	2E-05
	Homegrown produce ingestion	Cs-137	2E-06
		Pu-239/240	3E-05
		Sr-90	2E-05
	External radiation exposure	Ag-108m	7E-05
		Am-241	2E-05
		Cs-137	9E-03
		Eu-152	6E-05
		U-238	2E-06

Table 6-6. (continued).

Site/Exposure Scenario	Pathway	Contaminants of Concern	Excess Cancer Risk
	Exposure scenario total		**9E-03**
Residential 1,000-year	Soil ingestion	As	5E-06
		Am-241	1E-05
		Pu-239/240	7E-05
	Homegrown produce ingestion	Pu-239/240	3E-05
	External radiation exposure	Am-241	4E-06
		U-238	2E-06
	Exposure scenario total		**1E-04**
TRA-06 (Chemical Waste Pond)			
Occupational 0-year	Soil ingestion	As	2E-06
	Exposure scenario total		2E-06
Occupational 30-year	Soil ingestion	As	2E-06
	Exposure scenario total		2E-06
Residential 100-year	Soil ingestion	Aroclor-1260	1E-06
		As	2E-05
	Homegrown produce ingestion	As	2E-06
	Exposure scenario total		2E-05
Residential 1,000-year	Soil ingestion	Aroclor-1260	1E-06
		As	2E-05
	Homegrown produce ingestion	As	2E-06
	Exposure scenario total		2E-05
TRA-08 (Cold Waste Pond)			
Occupational 0-year	Soil ingestion	As	1E-05
	External radiation exposure	Co-60	1E-05
		Cs-137	1E-04
		Eu-154	7E-06
	Exposure scenario total		**1E-04**
Occupational 30-year	Soil ingestion	As	1E-05
	External radiation exposure	Cs-137	7E-05
	Exposure scenario total		8E-05
Residential 100-year	Soil ingestion	As	1E-04

Table 6-6. (continued).

Site/Exposure Scenario	Pathway	Contaminants of Concern	Excess Cancer Risk
	Homegrown produce ingestion	As	1E-05
	External radiation exposure	Cs-137	7E-05
		As	1E-05
	Exposure scenario total		**2E-04**
Residential 1,000-year	Soil ingestion	As	1E-04
	Homegrown produce ingestion	As	1E-05
	Exposure scenario total		**1E-04**
TRA-13 (Sewage Leach Pond)			
Occupational 0-year	External radiation exposure	Ag-108m	5E-05
		Co-60	4E-04
		Cs-134	1E-06
		Cs-137	7E-04
		Eu-152	2E-05
		Eu-154	1E-05
	Exposure scenario total		**1E-03**
Occupational 30-year	External radiation exposure	Ag-108m	4E-05
		Co-60	8E-06
		Cs-137	4E-04
		Eu-152	5E-06
	Exposure scenario total		**4E-04**
Residential 100-year	External radiation exposure	Ag-108m	1E-04
		Cs-137	4E-04
	Exposure scenario total		**5E-04**
Residential 1,000-year	External radiation exposure	Ag-108m	1E-06
	Exposure scenario total		1E-06
TRA-15			
Occupational 0-year	External radiation exposure	Co-60	1E-05
		Cs-134	1E-06
		Cs-137	3E-04
	Exposure scenario total		**3E-04**
Occupational 30-year	External radiation exposure	Cs-137	2E-04
	Exposure scenario total		**2E-04**
Residential 100-year	Soil ingestion	As	1E-05

Table 6-6. (continued).

Site/Exposure Scenario	Pathway	Contaminants of Concern	Excess Cancer Risk
	Homegrown produce ingestion	As	1E-06
	External radiation exposure	Cs-137	1E-04
	Exposure scenario total		**1E-04**
Residential 1,000-year	Soil ingestion	As	1E-05
	Homegrown produce ingestion	As	1E-06
	Exposure scenario total		1E-05
TRA-19			
Occupational 0-year	Soil ingestion	Cs-134	6E-06
		Cs-137	1E-04
		Sr-90	1E-05
	External radiation exposure	Co-60	1E-04
		Cs-134	1E-02
		Cs-137	2E-01
	Exposure scenario total		**2E-01**
Occupational 30-year	Soil ingestion	Cs-137	7E-05
		Sr-90	5E-06
	External radiation exposure	Co-60	3E-06
		Cs-137	8E-02
	Exposure scenario total		**8E-02**
Residential 100-year	Soil ingestion	Cs-137	6E-05
		Sr-90	4E-06
	Homegrown produce ingestion	Cs-137	1E-05
		Sr-90	6E-06
	External radiation exposure	Cs-137	8E-02
	Exposure scenario total		**8E-02**
Sewage Leach Pond-Soil Contamination Area and Berms			
Occupational 0-year	External radiation exposure	Ag-108m	1E-05
		Co-60	1E-04
		Cs-137	1E-04
	Exposure scenario total		**2E-04**
Occupational 30-year	External radiation exposure	Ag-108m	1E-05
		Co-60	2E-06
		Cs-137	7E-05

Table 6-6. (continued).

Site/Exposure Scenario	Pathway	Contaminants of Concern	Excess Cancer Risk
	Exposure scenario total		8E-05
Residential 100-year	External radiation exposure	Ag-108m	3E-05
		Cs-137	6E-05
	Exposure scenario total		9E-05
Brass Cap Area			
Occupational 0-year	Soil ingestion	Cs-134	6E-06
		Cs-137	1E-04
		Sr-90	1E-05
	External radiation exposure	Co-60	1E-04
		Cs-134	1E-02
		Cs-137	2E-01
	Exposure scenario total		**2E-01**
Occupational 30-year	Soil ingestion	Cs-137	7E-05
		Sr-90	5E-06
	External radiation exposure	Co-60	3E-06
		Cs-137	8E-02
	Exposure scenario total		**8E-02**
Residential 100-year	Soil ingestion	Cs-137	6E-05
		Sr-90	4E-06
	Homegrown produce ingestion	Cs-137	1E-05
		Sr-90	6E-06
	External radiation exposure	Cs-137	8E-02
	Exposure scenario total		**8E-02**

a. Total site risks >1E-04 are shown in bold.

Table 6-7. Contaminants and exposure pathways of concern for OU 2-13 sites with hazard indexes >1.0.[a]

Site/Exposure Scenario	Pathway	Contaminants of Concern	Hazard Index
TRA-03 (Warm Waste Pond)			
Residential 100-year	Homegrown produce ingestion	Hg	6E-01
	Exposure scenario total		6E-01
TRA-06 (Chemical Waste Pond)			
Occupational 0-year	Soil ingestion	Hg	2E-01
	Exposure scenario total		2E-01
Occupational 30-year	Soil ingestion	Hg	2E-01
	Exposure scenario total		2E-01
Residential 100-year	Soil ingestion	Hg	2E+00
		Sb	1E-01
	Homegrown produce ingestion	Ba	5E-01
		Hg	7E+01
		Mn	3E-01
		Zn	3E-01
	Exposure scenario total		**7E+01**
Residential 1,000-year	Soil ingestion	Hg	2E+00
		Sb	1E-01
	Homegrown produce ingestion	Ba	5E-01
		Hg	7E+01
		Mn	3E-01
		Zn	3E-01
	Exposure scenario total		**7E+01**
TRA-08 (Cold Waste Pond)			
Residential 100-year	Soil ingestion	As	5E-01
	Homegrown produce ingestion	Ba	1E-01
		Cd	2E-01
		Hg	3E-01
	Exposure scenario total		**1E+00**
Residential 1,000-year	Soil ingestion	As	5E-01
	Homegrown produce ingestion	Ba	1E-01
		Cd	2E-01
		Hg	3E-01
	Exposure scenario total		**1E+00**

Table 6-7. (continued).

Site/Exposure Scenario	Pathway	Contaminants of Concern	Hazard Index
TRA-13 (Sewage Leach Pond)			
Residential 100-year	Homegrown produce ingestion	Hg	2E+00
		Zn	2E+00
	Exposure scenario total		**4E+00**
Residential 1,000-year	Homegrown produce ingestion	Hg	2E+00
		Zn	2E+00
	Exposure scenario total		**4E+00**
TRA-15			
Residential 100-year	Soil ingestion	F	1E-01
	Exposure scenario total		1E-01
Residential 1,000-year	Soil ingestion	F	1E-01
	Exposure scenario total		1E-01

a. Total site hazard indexes are shown in bold.

Additional exposure routes that have calculated 100-year future residential risks within or above the National Contingency Plan (NCP) target risk range (one in ten thousand to one in one million excess cancer risk) at WAG 2 are ingestion of soil, ingestion of homegrown produce, and ingestion of groundwater. Estimated risks for ingestion of soil are within or above the target risk range at the TRA-619, TRA-626, TRA-653 PCB Spill Sites, the TRA-15 soil surrounding the Hot Waste Storage Tanks at TRA-613, the TRA-19 soil surrounding the Rad Tanks at TRA-630, the TRA-08 Cold Waste Pond, the TRA-03 Warm Waste Pond 1952 and 1957 cells, the TRA-04/05 soil between 0 and 10 ft below land surface surrounding the Retention Basin, the TRA-06 Chemical Waste Pond, the Brass Cap Area, and the Experimental Test Reactor Stack. Estimated risks for ingestion of homegrown produce are within or above the target risk range at the TRA-619, TRA-626, TRA-653 PCB Spill Sites, the TRA-15 soil surrounding the Hot Waste Storage Tanks at TRA-613, the TRA-19 soil surrounding the Rad Tanks at TRA-630, the TRA-08 Cold Waste Pond, the TRA-03 Warm Waste Pond 1952 and 1957 cells, the TRA-04/05 soil between 0 and 10 ft below land surface surrounding the Retention Basin, the TRA-06 Chemical Waste Pond, the Brass Cap Area, and the Experimental Test Reactor Stack. Estimated risk for external radiation exposure is within or above the target risk range at the North Storage Area, the TRA-15 soil surrounding Hot Waste Storage Tanks at TRA-613, the TRA-19 soil surrounding Rad Tank at TRA-630, the TRA-08 Cold Waste Pond, the TRA-04/05 soil between 0 and 10 ft below land surface surrounding the Retention Basin and the Cold Waste Sampling Pit and Sump, SLP-Berm and Soil Contamination Area, the Brass Cap Area, and the Hot Tree Site, in addition to the Sewage Leach Pond and the Warm Waste Pond 1952 and 1957 cells.

Recent investigations have determined that RCRA-listed waste may have been present in the TRA warm and hot waste systems when leaks to the environment occurred. Therefore, if excavation occurs, soils will be managed in a manner consistent with the hazardous waste determination to be performed at the time of the remedial action.

6.1.5 Human Health Risk Uncertainty

Many of the parameter uncertainty values used to calculate risks in the WAG 2 Baseline Risk Assessment and Ecological Risk Assessment (ERA) are uncertain. For example, limitations in site sampling produce some uncertainty associated with the extent of contamination at most of the WAG 2 sites. Limitations in the characterization of the WAG 2 physical environment produce some uncertainty associated with fate and transport properties of WAG 2 contaminants. To offset these uncertainties, parameter values were selected for use in the Baseline Risk Assessment and ERA so that the assessment's results would present an upper bound, and yet reasonable, estimate of WAG 2 risks. Assumptions and supporting rationale, along with potential impacts on the uncertainty, are included in Table 6-8.

6.2 Ecological Evaluation

The ecological assessment of the TRA is a qualitative evaluation of the potential effects of the sites on plants and animals other than people and domesticated species. A quantitative ecological assessment is planned in conjunction with the INEEL-wide comprehensive RI/FS scheduled for 1998. This INEEL-wide ecological assessment will provide an indication of the affect of INEEL releases in the ecology at a population level. There are no critical or sensitive habitats on or near TRA. Based on the present contaminant and ecological information and the qualitative eco-evaluation performed for this ROD, the remedies selected to address human health risks will serve to reduce the ecological risk posed at seven sites where both human health and potential ecological risk have been identified. The need for remedial action will be reconsidered at these sites as well as the remaining five sites if the INEEL-wide ecological risk assessment suggests that these conclusions are not well founded. However, it is unlikely that the INEEL-wide comprehensive RI/FS ecological assessment will identify the need for any additional actions at these sites.

Table 6-4 summarizes the results of the ERA evaluation for those sites that have potential to pose an unacceptable risk to ecological receptors.

6.2.1 Species of Concern

The only federally listed endangered species known to frequent the INEEL is the peregrin falcon. The status of the bald eagle in the lower 48 United States was changed from endangered to threatened in July 1995. Several other species observed on the INEEL are the focus of varying levels of concern by either federal or state agencies. Animal and avian species include the ferruginous hawk, the northern goshawk, the sharp-tailed grouse, the loggerhead shrike, the Townsend's big-eared bat, the pygmy rabbit, the gyrfalcon, the boreal owl, the flammulated owl, the Swainson's hawk, the merlin, and the burrowing owl. Plant species classified as sensitive include Lemhi milkvetch, plains milkvetch, wing-seed evening primrose, nipple cactus, and oxytheca.

Table 6-8. Human health assessment uncertainty factors.

Uncertainty factor	Effect of uncertainty	Comment
Source term assumptions	May overestimate risk	All contaminants are assumed to be completely available for transportation away from the source zone. In reality, some contaminants may be chemically or physically bound to the source zone and unavailable for transport.
Natural infiltration rate	May overestimate risk	A conservative value of 10 cm/yr was used for this parameter.
Moisture content	May overestimate or underestimate risk	Soil moisture contents vary seasonally in the upper vadose zone and may be subject to measurement error.
Water table fluctuations	May slightly overestimate or underestimate risk	The average value used is expected to be representative of the depth over the 30-year exposure period.
Mass of contaminants in soils estimated by assuming a uniform contamination concentration in the source zone.	May overestimate or underestimate risk	There is a possibility that most of the mass of a given contaminant at a given site may exist in a hotspot that was not detected by sampling. If this condition existed, the mass of the contaminant used in the analysis might be underestimated. However, 95% UCLs or maximum detected contamination were used for all mass calculations, and these concentrations are assumed to exist at every point in each waste site, so the mass of contaminants used in the analysis is probably overestimated.
Plug flow assumption in groundwater transport	Could overestimate or underestimate risk	Plug flow models are conservative with respect to concentrations because dispersion is neglected, and mass fluxes from the source to the aquifer differ only by the time delay in the unsaturated zone (the magnitude of the flux remains unchanged). For nonradiological contaminants, the plug flow assumption is conservative because dispersion is not allowed to dilute the contaminant groundwater concentrations. For radionuclides, the plug flow assumption may or may not be conservative. Based on actual travel time, the radionuclide groundwater concentrations could be over or underestimated because a longer travel time allows for more decay. If the concentration decrease due to the travel time delay is larger than the neglected dilution due to dispersion, the model will not be conservative.
No migration of contaminants from the soil source before 1994	Could overestimate or underestimate risk	The effect of not modeling contaminant migration from the soil before 1994 is dependent on the contaminant half-life, radioactive ingrowth, and mobility characteristics.
Chemical form assumptions	Could overestimate or underestimate risk	In general, the methods and inputs used in contaminant migration calculations, including assumptions made regarding chemical forms of contaminants were chosen in order to err on the protective side. All contaminant concentration and mass are assumed available for transport. This assumption results in a probable overestimate of risk.

Table 6-8. (continued).

Uncertainty factor	Effect of uncertainty	Comment
Exposure scenario assumptions	May overestimate risk	The likelihood of future scenarios has been qualitatively evaluated as follows: resident—improbable industrial—credible. The likelihood of future onsite residential development is small. If future residential use of this site does not occur, then the risk estimates calculated for future onsite residents are likely to overestimate the true risk associated with future use of this site.
Exposure parameter assumptions	May overestimate risk	Assumptions regarding media intake, population characteristics, and exposure patterns may not characterize actual exposures.
Receptor locations	May overestimate risk	Groundwater ingestion risks are calculated for a point at the downgradient edge of an equivalent rectangular area. The groundwater risk at this point is assumed to be the risk from groundwater ingestion at every point within the TRA boundaries. Changing the receptor location will only affect the risks calculated for the groundwater pathway since all other risks are site-specific or assumed constant at every point within the TRA boundaries.
For the groundwater pathway analysis, all contaminants were assumed to be homogeneously distributed in a large mass of soil.	May overestimate or underestimate risk	The total mass of each COPC is assumed to be homogeneously distributed in the soil volume beneath TRA. This assumption tends to maximize the estimated groundwater concentrations produced by the contaminant inventories because homogeneously distributed contaminants would not have to travel far to reach a groundwater well drilled anywhere within the TRA boundary. However, groundwater concentrations may be underestimated for a large mass of contamination (located in a small area with a groundwater well drilled directly downgradient).
The entire inventory of each contaminant is assumed to be available for transport along each pathway	May overestimate risk	In reality, only a portion of each contaminant's inventory will be transported by each pathway.
Exposure duration	May overestimated	The assumption that an individual will work or reside at the site for 25 or 30 years is conservative. Short-term exposures involve comparison to subchronic toxicity values, which are generally less restrictive than chronic values.
Noncontaminant-specific constants (not dependent on contaminant properties)	May overestimate risk	Conservative or upper bound values were used for all parameters incorporated into intake calculations.
Exclusion of some hypothetical pathways from the exposure scenarios	May underestimate risk	Exposure pathways are considered for each scenario and eliminated only if the pathway is either incomplete or negligible compared to other evaluated pathways.
Model does not consider biotic decay	May overestimate risk	Biotic decay would tend to reduce contamination over time.

Table 6-8. (continued).

Uncertainty factor	Effect of uncertainty	Comment
Occupational intake value for inhalation is conservative	Slightly overestimates risk	Standard exposure factors for inhalation have the same value for occupational as for residential scenarios although occupational workers would not be onsite all day.
Use of cancer slope factors	May overestimate risk	Slope factors are associated with upper 95th percentile confidence limits. They are considered unlikely to underestimate true risk.
Toxicity values derived primarily from animal studies	May overestimate or underestimate risk	Extrapolation from animal to humans may induce error due to differences in absorption, pharmacokinetics, target organs, enzymes, and population variability.
Toxicity values derived primarily from high doses, most exposures are at low doses	May overestimate or underestimate risk	Assumes linearity at low dose. Tend to have conservative exposure assumptions.
Toxicity values and classification of carcinogens	May overestimate or underestimate risk	Not all values represent the same degree of certainty. All are subject to change as new evidence becomes available.
Lack of slope factors	May underestimate risk	COPCs without slope factors may or may not be carcinogenic through the oral pathway.
Lack of RfDs	May underestimate risk	COPCs without RfDs may or may not have noncarcinogenic adverse effects.
Risk/HQs summed across pathways	May overestimate risk	Not all of the COPC inventory will be available for exposure through all applicable exposure pathways.

6.2.2 Exposure Assessment

Three primary media were identified to have the potential for posing risk to WAG 2 ecological components: contaminated surface soil, contaminated subsurface soil, and contaminated surface water. Ingestion of contaminated groundwater was not considered because groundwater is not accessible to ecological receptors. For plants, the uptake of contaminants through root systems was considered.

The amount of exposure is directly related to the amount of time spent and the fraction of diet taken on the sites. Therefore exposures are greatest for permanent ecological residents, particularly plants and small burrowing animals. The small size of the sites of concern at WAG 2 is expected to minimize the exposures received by migratory species, which include most avian and large mammal species that inhabit the INEEL.

Table 6-4 summarizes the results of the ERA evaluation for those sites that pose an unacceptable risk to ecological receptors.

6.2.3 Ecological Risk Evaluation

Of the sites and COPCs assessed, two sites were eliminated as posing no potential risk to ecological receptors (TRA-39 and the ETR Stack). In addition, TRA-34, TRA-619, TRA-626, and TRA-653 were determined to be highly unlikely to pose risk to ecological receptors and, therefore, were eliminated from consideration. The PCB sites (TRA-619, 626, and 653) exceeded the target value for only one functional group (avian insectivores). Given the size of these sites, it is highly unlikely that the member of this group (swallows) would have an exposure that would result in adverse effects. The sites were therefore eliminated. For site TRA-39, no contaminant exceeded the target value; therefore, this site was eliminated from further consideration. The results of the assessment indicate risk at the remaining 12 sites as follows: from internal and external exposure to radionuclides at the Brass Cap Area and TRA-19 soil surrounding Rad Tanks 1 and 2 at TRA-630; from internal exposure to radionuclides at TRA-03 Warm Waste Pond, as well as from a metal at TRA-03; and from both metals and organic compounds at the following sites: TRA-02 TRA Paint Shop Ditch, TRA-04/05 Warm Waste Retention Basin and Sampling Pit, TRA-06 Chemical Waste Pond, TRA-08 Cold Waste Pond, TRA-13 Sewage Leach Ponds, TRA-15 Hot Waste Tanks at TRA-613, TRA-16 Inactive Radioactive Contaminated Tank at TRA-614, TRA-36 ETR Cooling Tower Basin, and TRA-38 ATR Cooling Tower. These sites are all associated with ongoing TRA facility operations. For a complete description of the ecological risk assessment process, please refer to the WAG 2 Comprehensive Remedial Investigation/Feasibility Study Report located in the administrative record. The TRA-02 Paint Shop Ditch, TRA-04/05 Warm Waste Retention Basin and Sampling Pit, TRA-16 Inactive Radioactive Contaminated Tank at TRA-614, TRA-36 ETR Cooling Tower Basin, and TRA-38 ATR Cooling Tower sites pose only a potential ecological risk.

A basic assumption of the ERA is that, under a future-use scenario, the contamination is present at an abandoned site that will not be institutionally controlled. In actuality, co-located facilities are currently in use, and institutional controls will remain in place until they are decommissioned. Because these sites are at an industrial facility that is currently in use, they most likely do not contain desirable or valuable habitat. The absence of habitat, the existence of facility activities, and institutional controls will minimize the exposure of ecological receptors.

The ERA determined that risks to ecological receptors may exist at 12 sites at WAG 2. Four sites (TRA-03, TRA-06, TRA-08, and TRA-13) are outside the TRA facility fence. Human health risks exceeding allowable levels exist at these sites, and some level of remediation ranging from institutional controls to active remediation will be required. Any remedial alternative that reduces human health risks would be expected to also reduce ecological risks. The remaining sites are inside the facility fence, where ongoing facility operations result in limited ecological exposures, as discussed previously. The relatively small size of these sites, including TRA-02, -16, and -38, would also likely result in little or no ecological risks. The results of these studies can be found in the Environmental Science and Research Foundation 1996 Annual Technical Report, located in Idaho Falls, Idaho.

Recent D&D activities during the summer of 1996 at the TRA-645 building discovered radioactive barn swallow nests. Barn swallows are common at most facilities on the INEEL and are know to nest near many wastewater ponds found on the site. In a study conducted in 1976 through 1978, barn swallows nesting at the TRA were found to build nests with radionuclide-contaminated materials and to accumulate radionuclides internally by ingesting arthropods from radioactive leach ponds. The results of this study indicate that no obvious direct effects to the barn swallows or their clutches were found. Recent studies conducted in 1995 showed that average radionuclide concentrations in adult barn swallows are about 54 to 314 times lower than those observed in the 1976 study.

6.2.4 Ecological Risk Uncertainty

Uncertainty is inherent in the risk process. Principal sources of uncertainty lie within the development of an exposure assessment. Uncertainties inherent in the exposure assessment are associated with estimation of receptor ingestion rates, selection of acceptable HQs, estimation of site usage, and estimation of plant uptake factors and bioaccumulation factors. Additional uncertainties are associated with the depiction of site characteristics, the determination of the nature and extent of contamination, and the derivation of Threshold Limit Values. All of these uncertainties likely influence risk.

Overall, it is important to reiterate that it was anticipated that the conservative nature of the ERA at the WAG level would result in many sites and contaminants being indicative of potentially unacceptable risk to ecological receptors. This is due to the exposure calculations using a very conservative approach and is also compounded by the methods used to determine extent of contamination and characterize exposure concentrations at each release site.

Because of these considerations, the relative small size of the sites, and the conservatism of the ecological risk assessment, no significant ecological impact is anticipated from these sites. The need for remedial action at sites posing a potentially unacceptable ecological risk will be reconsidered if the INEEL-wide ecological risk assessment suggests that these conclusions are not well founded.

6.3 Groundwater Fate and Transport

WAG 2 includes three potential sources of groundwater contamination: contamination contained in perched water bodies beneath TRA, contamination injected into the aquifer by the TRA-05 disposal well, and contamination that could leach from surface and near-surface soil. From 1964 until 1972, the TRA-05 disposal well was used to dispose of the secondary reactor cooling water. This disposal well injected directly into the SRPA and did not contribute contaminants to the Perched Water System. After 1972, hexavalent chromium was no longer used as a rust inhibitor in the cooling systems and was no longer discharged to the disposal well or to the ponds. Use of the disposal well ceased in 1982. Groundwater contamination produced by perched water system infiltration and disposal well injection was evaluated as part of the OU 2-12 perched water system RI, while contamination that could leach into the SRPA from surface and near surface soil was evaluated using the computer code GWSCREEN in the baseline risk assessment.

As discussed in the OU 2-12 perched water system RI, the principal groundwater COCs at WAG 2 are chromium and tritium (H-3). The Third Annual Technical Memorandum states that the MCLs for chromium and H-3 have been exceeded in various wells throughout the OU 2-12 monitoring. Specifically, the MCL for chromium is 100 µg/L, and the MCL for H-3 is 20 pCi/mL. To date, the monitoring indicates the following about the TRA wells: (a) the long-term concentration trend (1988-present) is decreasing for both contaminants in USGS-55, USGS-56, and USGS-65; (b) the short-term, post-ROD concentration pattern (1993-present) is variable in USGS-55, increasing in USGS-56, and near stable in USGS-65; (c) the concentration trend for chromium is increasing in USGS-53 but decreasing in USGS-64; and (d) the concentration trend for H-3 is decreasing in USGS-53. In addition, there are insufficient TRA-7 data to make contaminant trend determinations.

As discussed in the OU 2-12 ROD, H-3 is expected to fall below MCLs by the year 2004, and chromium is expected to fall below MCLs by the year 2016. So neither contaminant is expected to produce unacceptable risks from groundwater ingestion at WAG 2 if residential development occurs at TRA in 100 years. The radiologically contaminated wastewater source to the Warm Waste Pond has been removed. The groundwater modeling performed for the OU 2-12 RI/FS predicted that the H-3 contamination in the SRPA beneath TRA will naturally be reduced to concentrations that are less than MCLs through radioactive decay and downgradient transport, and that most of the chromium contamination will be reduced via dilution and dispersion.

The groundwater contamination below the TRA commingles with groundwater contamination below the Idaho Chemical Processing Plant (ICPP). The groundwater contamination below the ICPP is being evaluated as part of the OU 3-13 Comprehensive RI/FS. Because of the commingling nature of the plumes below the TRA and ICPP, the chromium and H-3 contamination in the SRPA beneath TRA is being evaluated in the draft OU 3-13 RI/baseline risk assessment. To accomplish this evaluation, the GWSCREEN fluxes derived in the OU 2-13 TRA Groundwater Flow and Contaminant Transport Model were provided for input into the OU 3-13 flow and transport model. The flow and transport model being used for the OU 3-13 baseline risk assessment is TETRAD, a proprietary three dimensional code. The primary time frame of interest for the modeling is 100 years in the future. During this time frame, concentration contours and peak concentrations in the aquifer are calculated for both H-3 and chromium. In addition, the model simulates transport of each contaminant until its peak concentration falls below a concentration equal to the 1E-06 risk concentration or the contaminant's MCL, whichever is lower.

The only other contaminant that is predicted to produce groundwater risks greater than 1E-06 at WAG 2 is arsenic. No remedial action is recommended to lower arsenic groundwater risk because the risk is less than the risk level of 1E-04 that has been agreed to by the agencies as the basis for groundwater remedial action objectives (RAOs), and the predicted concentrations of arsenic are less than the MCL.

6.4 Basis for Response

Eight sites within TRA have actual or threatened releases of hazardous substances, which, if not addressed by implementing the response actions selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment. These sites include four disposal ponds [Warm Waste Pond (TRA-03), Chemical Waste Pond (TRA-06), Cold Waste Pond (TRA-08), and the Sewage Leach Pond (TRA-13)], three subsurface contaminant release sites [Soil Surrounding Hot Waste Tanks at Building 613 (TRA-15), Tanks 1 and 2 at Building 630 (TRA-19), and the Brass Cap Area], and one area of surficial windblown contamination (Sewage Leach Pond Berms and Soil Contamination Area). The response actions selected in this ROD are designed to reduce the potential threats to human health and the environment to acceptable levels.

The ERA for WAG 2 determined that potential risks to ecological receptors exist at 12 sites. Four of these sites (the Warm Waste Pond, Chemical Waste Pond, Cold Waste Pond, and the Sewage Lagoons) are outside the TRA facility fence. Human health risks exceeding allowable levels exist at these sites, and some level of remediation will be required. The TRA-02 Paint Shop Ditch, TRA-04/05 Warm Waste Retention Basin and Sampling Pit, TRA-16 Inactive Radioactive Contaminated Tank at TRA-614, TRA-36 ETR Cooling Tower Basin, and TRA-38 ATR Cooling Tower sites pose only a potential ecological risk. The need for remedial action at sites posing a potentially unacceptable ecological risk will be reconsidered if the INEEL-wide ecological risk assessment suggests that these conclusions are not well founded. Any remedial alternative that reduces human health risks would be expected to also reduce ecological risks. The remaining sites are inside the facility fence, where ongoing facility operations result in limited ecological exposure. The relatively small size of these sites would also likely result in little or no ecological risk. The need for remedial action will be considered if the INEEL-wide ecological risk assessment suggests that these conclusions are not well founded.

7. DESCRIPTION OF ALTERNATIVES

7.1 Remedial Action Objectives

Remedial action objectives for TRA (OU 2-13) were developed in accordance with the NCP and CERCLA RI/FS guidance. The RAOs were defined through discussions among agencies (IDHW, EPA, and DOE). The RAOs are based on the results of the human health risk assessment and are specific to the COCs and exposure pathways developed for OU 2-13. They are as follows:

For protection of human health

- Inhibit direct exposure to radionuclide COCs that would result in a total excess cancer risk of greater than 1 in 10,000 to 1,000,000 (1E-04 to 1E-06) to current and future workers and future residents.

- Inhibit ingestion of radionuclide and nonradionuclide COCs by all affected exposure routes (including soil and groundwater ingestion, and ingestion of homegrown produce) that would result in a total excess cancer risk of greater than 1 in 10,000 to 1,000,000 (1E-04 to 1E-06) or a hazard index greater than 1 to current and future workers and future residents.

- Inhibit degradation of any low-level soil repository covers (e.g., Warm Waste Pond 1952 and 1957 cell covers) that would result in exposure to buried wastes or migration of contaminants to the surface that would pose a total excess cancer risk (for all contaminants) of greater than 1 in 10,000 to 1,000,000 (1E-04 to 1E-06) or a hazard index greater than 1 to current and future workers and future residents.

For protection of the environment

- Inhibit adverse effects to resident populations of flora and fauna, as determined by the ecological risk evaluation, from soil, surface water, or air containing COCs.

- Inhibit adverse effects to sites where COCs remain in place below ground surface that could result in exposure to COCs or migration of COCs to the surface.

To meet these objectives, preliminary remediation goals (PRGs) were established. These goals are quantitative cleanup levels based primarily on ARARs and risk-based doses. The PRGs are used in remedial action planning and assessment of effectiveness of remedial alternatives. Final remediation goals are based on the results of the baseline risk assessment and evaluation of expected exposures and risks for selected alternatives.

The 1 chance in 10,000 risk (1E-04) or hazard index of 1, whichever is more restrictive for a given contaminant, is the primary basis for determining PRGs for the OU 2-13 sites of concern. The basis for using the upper end of the 1E-04 to 1E-06 is justified based on the remoteness of the site, conservatism of the risk assessments, the absence of current residents, and modeling 100 years in the future for future residents, and as consistent with exposure levels established to be acceptable by EPA for radionuclides. Preliminary remediation goals for individual COCs were defined by calculating soil concentrations that would result in excess cancer risks equal to 1E-04 or hazard indexes equal to 1 for the 100-year future residential exposure scenario due to exposure to all of a site's COCs. For example, if a given site contained only one COC, the PRG basis for the COC was risk equal to 1E-04 and hazard index equal to 1. But if the site contained two COCs, the PRG basis was risk equal to 1E-04 divided by 2 (or 5E-05) and a hazard index equal to 1/2. The primary COCs for WAG 2 are radionuclides. Table 7-1 presents the final remediation goals that have been established for the eight sites of concern in OU 2-13. Remedial actions will ensure that risk is mitigated to the point that exposure would not exceed these levels. On the basis of these remediation goals, areas and volumes of contaminated media that would require some form of remedial action were identified. These estimated areas, depths, and volumes are presented in Table 7-2.

7.2 Summary of Alternatives

In accordance with Section 121 of CERCLA, the FS identified alternatives that (a) achieve the stated RAOs, (b) provide overall protection of human health and the environment, (c) meet ARARs, and (d) are cost effective. These alternatives, used individually or in combination, can satisfy the RAOs through reduction of contaminant levels, volume or toxicity, or by isolation of contaminants from potential exposure and migration pathways. For OU 2-13 (TRA) sites, soil is the only medium of concern targeted for remediation. Five alternative categories were identified to meet the RAOs for contaminated soil at OU 2-13 sites:

1. No Action (with monitoring)
2. Limited Action
3. Containment and Institutional Controls
4. Excavation, Treatment, and Disposal
5. Excavation and Disposal.

Estimated present worth costs for the remedial alternatives for all sites are shown in Table 9-2 in Section 9. Post-closure costs were estimated for the full duration of the 100-year period of monitoring.

7.2.1 Alternative 1: No Action (With Monitoring)

The NCP [40 CFR 300.430(e)(6)] requires consideration of a No Action alternative to serve as a baseline for evaluation of other remedial alternatives. The No Action (with monitoring) alternative does not involve active remedial actions but environmental monitoring may be warranted if contamination were left in place under this alternative. Monitoring would enable identification of potential contaminant migration within environmental media (air, groundwater, and soil) or other changes in site conditions that may warrant future remedial actions. No land-use restriction, controls, or active remedial measures are implemented at the site. If warranted, monitoring is an institutional action assumed to remain in effect for at least 100 years. For the sites in this ROD, environmental monitoring would consist of radiological surveys in appropriate areas and groundwater monitoring. Air monitoring will be performed as part of the air monitoring program. It is anticipated that monitoring will be conducted at least annually, but the frequency will be determined during the remedial design as well as the appropriate areas.

Table 7-1. Final remediation goals for OU 2-13 sites of concern.

Site	Contaminant of Concern	Final Remediation Goals (mg/kg for nonradionuclides pCi/gm for radionuclides)[a,b,c]
Warm Waste Pond (TRA-03)	Ag-108m	0.39
	Cs-137	7.78
	Eu-152	99.9
Chemical Waste Pond (TRA-06)	Ba	926
	Mn	146
	Hg	0.47
	Zn	43.3
Cold Waste Pond (TRA-08)	As	18.3
	Cs-137	11.7
Sewage Leach Pond (TRA-13)	Hg	0.94
	Zn	86.6
	Ag-108m	0.58
	Cs-137	11.7
Soil surrounding hot waste tanks at Building 613 (TRA-15)	Cs-137	23.3
Soil surrounding Tanks 1 and 2 at Building 630 (TRA-19)	Cs-137	23.3
Brass Cap Area	Cs-137	23.3
Sewage Leach Pond Berm and Soil Contamination Area	Cs-137	23.3

a. Final remediation goals are soil concentrations of COCs that would result in a cumulative excess cancer risk of 1 in 10,000 or a hazard index greater than 1 for the 100-year residential exposure scenario. These may vary during the actual cleanup in recognition of natural background levels as established in Rood, 1995, and in recognition that cleanup to within the acceptable risk range could be achieved with a different mix of the COCs than was assumed in establishing these final remediation goal (FRG) values.

b. See Section 7.1 for a discussion of the risk basis for these FRGs. These FRGs may be met via installation of a cover to ensure that these levels are not exceeded through an available exposure pathway.

c. This table was generated during the RI/FS process.

Table 7-2. Estimated area and volume of contaminated media requiring remedial action.

Site	Surface Area (ft^2)	Depth of Contamination (ft)	Soil Volume[a] (ft^3)
Disposal Pond Sites			
Warm Waste Pond (TRA-03)	5.88E+04	1.23E+01	7.23E+05
Chemical Waste Pond (TRA-06)	2.90E+04	5.00E-01	1.45E+04
Cold Waste Pond (TRA-08)	1.58E+05	5.00E-01	7.92E+04
Sewage Leach Pond (TRA-13)	3.25E+04	6.00E+00	1.95E+05
Subsurface Release Sites			
Hot Waste Tanks at Building 613 (TRA-15)	6.24E+02	3.83E+01	2.39E+04
Tanks 1 and 2 at Building 630 (TRA-19)	6.00E+01	1.00E+01	6.00E+02
Brass Cap Area	2.83E+02	1.00E+01	2.83E+03
Windblown Surficial Contamination Site			
Sewage Leach Pond Berm and Soil Contamination Area (outside fence)	2.26E+05	5.00E-01	1.13E+05

a. Estimated soil volume for remediation = 6.24E+03 ft^3 based on 10-ft excavation depth.

While the No Action alternative does not involve any construction or operational activities that would result in disturbances to the surfaces of the OU 2-13 sites, IDAPA 16.01.01.650 could nonetheless apply to any sites that were a source of fugitive dust and is, therefore, considered an ARAR that would not be met. If metals and semivolatile organic compounds were present in fugitive dust, then IDAPA 16.01.01.585-586 are ARARs that would not be met. 40 CFR 122.26 would similarly apply, and would not be met. IDAPA 16.01.11.200 would be met by ongoing groundwater monitoring. The No Action alternative would not meet DOE orders because health risks to current workers and potential future residents exceed allowable ranges. The estimated cost for implementing the No Action (with monitoring) alternative is relatively low when compared to the other alternatives and ranges from $2.2M at the Brass Cap site to $3.2M at the Warm Waste Pond.

7.2.2 Alternative 2: Limited Action

A Limited Action alternative was developed primarily for those sites posing an unacceptable risk to current and future workers and for which the radionuclide contamination will decay to acceptable levels within the next 100 years. However, this alternative may be implemented in conjunction with a contingent remedial alternative for those sites determined to pose an unacceptable risk and where access is physically limited thereby inhibiting full implementation of the contingent remedy at this time. This alternative essentially continues management practices and institutional controls currently in place at OU 2-13 disposal pond, surficial contaminated soil, and buried contaminated soil sites. Current management practices and institutional controls are in place as a result of Department of Energy responsibilities and authorities for maintaining security, control, and safety at DOE facilities. These responsibilities and authorities have their basis in the Atomic Energy Act of 1954. For DOE facilities, Federal Regulation 10 CFR 835 implements the Radiation Protection Guidance to Federal Agencies for Occupational Workers, recommended by the EPA and issued by the President on January 20, 1987. The requirements of this regulation include standards for control of occupational radiation exposure, control of access to radiological areas, personnel training, and record keeping.

In addition, the regulations specify limits for maintaining occupational radiation exposure as low as reasonably achievable (ALARA), and requires that DOE activities be conducted in compliance with a documented radiation protection program approved by DOE. At INEEL, the requirements of 10 CFR 835 are primarily implemented through DOE Order 5400.5. Regulations for the protection and security of DOE facilities are included in 10 CFR 860, which prohibits unauthorized entry. This regulation is implemented through DOE Order 5632.1C. At the INEEL, the requirements of this order are primarily implemented through DOE's Management and Operating Safeguards and Security manuals. The manuals and associated control procedures define the programs and requirements for protecting INEEL property, personnel, and sensitive information. The manuals include defining the processes for protecting controlled property from theft, intentional acts of destruction and misuse, access controls for employees and offsite visitors to the INEEL, and procedures for conducting investigations or security incidents.

A description of the areas where access will be restricted, the specific controls (e.g., fences, signs) that will be used to ensure that access will be restricted, the types of activities that will be prohibited in certain areas (e.g., excavation), and the anticipated duration of such controls will be placed in the "INEEL Comprehensive Facility and Land Use Plan" maintained by the Office of Program Execution. DOE shall also provide the Bureau of Land Management the detailed description of controls identified above. This information will be submitted to the EPA and IDHW once it has been placed in the INEEL Comprehensive Facility and Land Use Plan.

DOE-ID will submit a written evaluation of the effectiveness of the institutional controls at the TRA as part of every 5-year review. This report, at a minimum, will include a description of a walk-through of the areas subject to institutional controls conducted at the time of each 5-year review.

Short-term effectiveness of this alternative is considered high, as this alternative is already implemented at the sites. Radiation control area fences and signs are maintained. No specialized equipment, personnel, or services are required to continue to implement the Limited Action alternative. Implementation of this alternative would have no physical effect or habitat alteration on the environment beyond what is already there.

The estimated costs for implementing the Limited Action alternative are described in Sections 8 and 9 of this ROD.

7.2.3 Alternatives 3a and 3b: Containment Alternatives and Institutional Controls

The two containment alternatives consist of the isolation of contaminated soil from potential receptors (for the period of time that unacceptable cumulative exposure risks will be present) through the use of a protective cover followed by institutional controls, including long-term environmental monitoring, [as described above for the No Action (with monitoring) alternative] cover integrity monitoring and maintenance, access restrictions, and surface water diversion. Institutional controls are assumed to remain in effect for at least 100 years. These alternatives were considered for the Waste Disposal Ponds and Subsurface Release Sites at TRA.

Alternative 3a consists of an engineered cover originally developed by the Uranium Mill Tailings Remedial Action program for stabilization of abandoned uranium mill tailings. This design, based on recent biointrusion research studies at the INEEL, was recently constructed at the INEEL stationary Low-Power Reactor-I burial ground site (Figure 7-1). This cover

- Requires minimal maintenance
- Inhibits inadvertent human intrusion
- Minimizes plant and animal intrusion
- Inhibits contaminant migration.

The cover design consists of four layers of natural geologic materials, with the uppermost layer consisting of rock riprap to inhibit intrusion and minimize erosion, a second layer of gravel overlying a third layer of riprap or cobbles, and a fourth layer consisting of gravel. Deviation from this sequence of materials and respective material thicknesses is not anticipated; however, the engineered cover design may be refined during the remedial design phase.

Alternative 3b consists of a native soil cover. This cover consists of a 10-ft (3-m) single layer of lower permeability soil obtained on the INEEL, applied in lifts and compacted to 95% of optimum moisture and density (see Figure 7-1). The surface would be completed to promote runoff and may be vegetated with a crested wheatgrass mixture that does not require supplemental water or nutrients once established, or a gravel mulch/rock armor material to be determined during remedial design. Specific design elements for the native soil cover will be developed during the remedial design phase.

Each capping technology is designed to prevent direct radiation exposures, resist erosion because of wind and surface water runoff, and resist biointrusion that may penetrate the contamination zone or facilitate erosion. The primary differences between capping technologies are the length of time these functions can be maintained and the effectiveness of the biointrusion and erosion control components of the designs. The design life of the capping technologies specified for the containment alternatives will depend on the construction materials specified, number and thickness of layers required, and sequence of those layers. The long-term effectiveness and permanence required at the Warm Waste Pond and the Sewage Leach Pond is at least the decay time required to reduce external exposure risks to acceptable levels. The engineered barrier design is likely to provide a higher level of protection against biointrusion. Thick soil will eliminate intrusion into waste by most INEEL species, but not all plants and invertebrates. Root intrusion into contaminated soils could result in mobilization of radionuclides to environmental

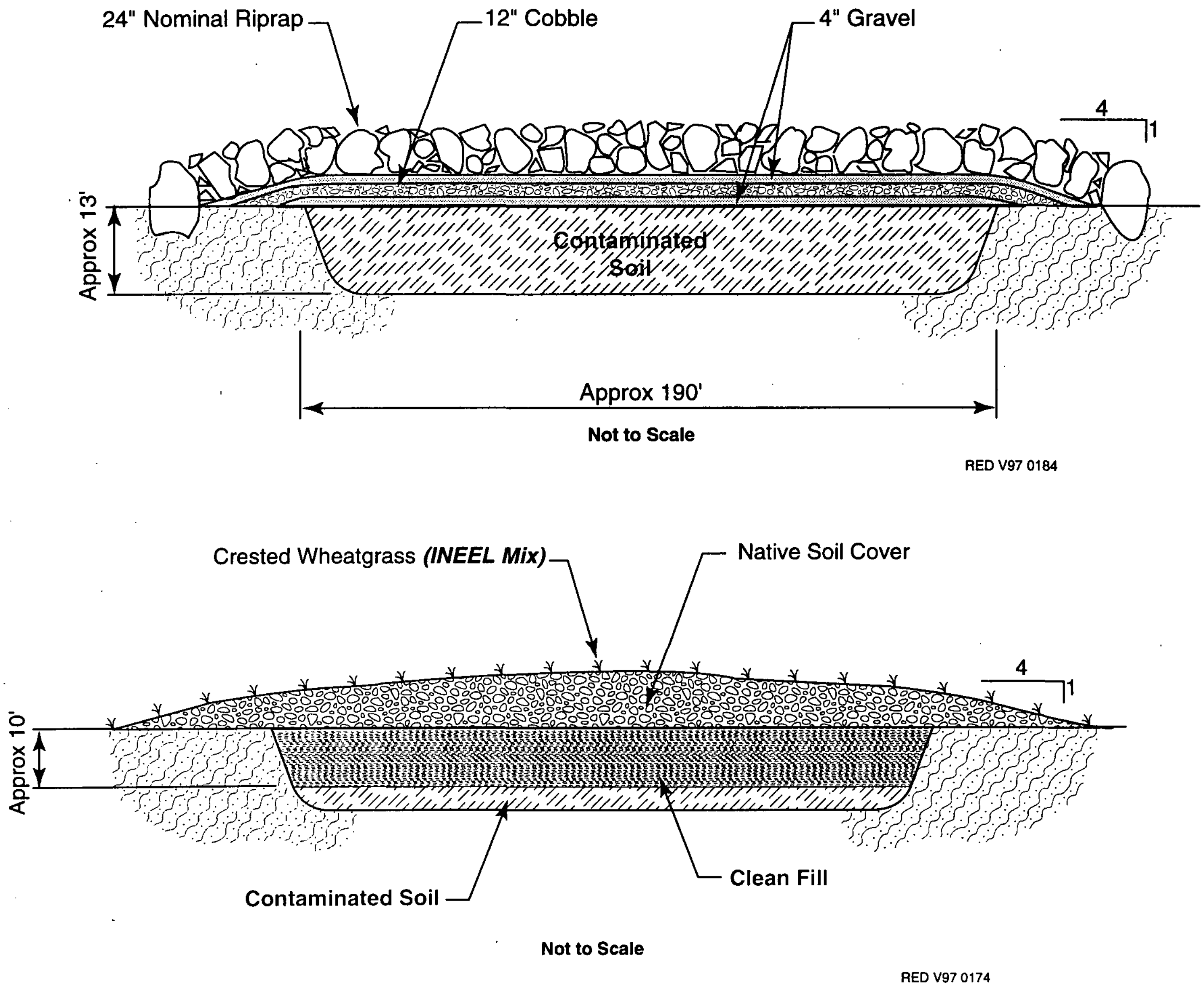


Figure 7-1. Cross-sectional schematic typical of the engineered cover and the native soil cover.

receptors. The engineered barrier is also likely to provide more effective control of wind erosion. Vegetated surfaces are erosion resistant, but fire and other natural and human activities, including grazing, could reduce or eliminate vegetation and allow wind erosion to occur.

Environmental impacts resulting from the excavation and construction activities would be minimal. Materials would be excavated, transported, and placed entirely within previously disturbed areas. Installation of surface water diversion controls at the OU 2-13 disposal pond sites might result in alteration of the nearby terrain. However, the overall impact of these activities is not considered irreparable and would be unnoticeable in the long run. The remoteness of the site would prevent any impact to the surrounding communities during construction activities. No environmentally sensitive areas such as archaeological or historical sites, wetlands, or critical habitat exist in the vicinity of the OU 2-13 sites, because all are in previously disturbed areas.

Costs associated with the cover alternatives at each site are detailed in Sections 8 and 9 of this ROD.

7.2.4 Alternative 4: Excavation, Treatment, and Disposal

Standard treatment technologies have not been shown to be effective for the radionuclide-contaminated soils at INEEL. Based on previous INEEL studies, no technology or combination of technologies has been demonstrated to be able to achieve significant volume reduction of radionuclide-contaminated TRA soils and sediments, primarily because of the binding of cesium in both surface microfissures of large-grained soil fractions, and in the silicate lattices of clay materials of fine grained fractions.

Technologies evaluated include physical separation using screening, flotation, attrition scrubbing, monitor and gate systems, soil washing, chemical stabilization, and thermal treatment using plasma torch. Therefore, this alternative was identified as being potentially applicable only to the sediments of the Chemical Waste Pond (TRA-06) that are contaminated with mercury. Under this alternative, those sediments with mercury concentrations exceeding 260 ppm would be excavated and treated with a mercury retort process. These sediments would be heated, volatilizing mercury as a vapor. The vapor would be subsequently cooled, and the liquid mercury would be recovered for recycling and disposal. Equipment would include a feed conveyor, heating units, heat exchangers, condensers, and air pollution control equipment, including a baghouse and granular activated carbon absorbers. This alternative would achieve long-term effectiveness because of the expected reduction in contaminant mobility, volume, and toxicity of the treated sediments.

Implementation of the mercury retort process is dependent on mercury contamination being present at concentrations exceeding 260 ppm and whether the mercury is in an elemental or ionized state. During the remedial design phase, further consideration may also be given to other potentially appropriate treatment process options identified in the OU 2-13 comprehensive RI/FS such as stabilization of mercury-contaminated soils. The determination as to whether this treatment technology is appropriate or not will be dependent upon post-ROD sampling of the Chemical Waste Pond. The goals of the post-ROD sampling will be to determine the nature and extent of contamination at the Chemical Waste Pond, although it is anticipated that mercury will be the primary focus of the sampling effort. The costs associated with excavation, treatment, and disposal are estimated in Section 8 and 9 of this ROD.

7.2.5 Alternative 5: Excavation and Disposal

This alternative involves complete removal of material contaminated at unacceptable concentration levels from a human health perspective, to levels of intrusion (maximum of 10 ft) or to the maximum depth at which contaminant concentrations exceed preliminary remediation goals, whichever is less. This would be followed by offsite transportation and disposal at a disposal facility licensed to receive low-level radioactively contaminated soils. Verification samples would be collected to ensure that the final remediation goals were met.

The license for a disposal facility will specify the radionuclide activity levels that can be accepted. Transportation would involve a combination of onsite trucking to a railhead and offsite rail transportation to the disposal facility.

This alternative provides long-term effectiveness because the contamination would be removed from the site. Long-term monitoring would no longer be required, assuming removal of contaminated soils achieve acceptable levels. Costs of excavation and disposal, which are high compared to other alternatives considered, can be found in greater detail in Sections 8 and 9 of this ROD.

7.3 Summary of Comparative Analysis of Alternatives

The five alternatives discussed in Section 7.2 were evaluated using the nine evaluation criteria as specified by CERCLA:

1. *Overall protection of human health and the environment*—addresses whether a remedy provides adequate protection of human health and the environment, and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

2. *Compliance with ARARs*—addresses whether a remedy will meet all of the ARARs under federal and state environmental laws and/or justifies a waiver.

3. *Long-term effectiveness and permanence*—refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met.

4. *Reduction of toxicity, mobility, or volume through treatment*—addresses the degree to which a remedy employs recycling or treatment that reduces the toxicity, mobility, or volume of the COCs', including how treatment is used to address the principal risks posed by the site.

5. *Short-term effectiveness*—addresses any adverse impacts on human health and the environment that may be posed during the construction and implementation period, and the period of time needed to achieve cleanup goals.

6. *Implementability*— addresses the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.

7. *Cost*—includes estimated capital and operation costs, expressed as net present-worth costs.

8. *State acceptance*—reflects aspects of the preferred alternative and other alternatives that the state favors or objects to, and any specific comments regarding state ARARs or the proposed use of waivers.

9. *Community acceptance*—summarizes the public's general response to the alternatives described in the Proposed Plan and in the RI/FS, based on public comments received.

Table 7-3 presents the results of the comparative analysis of the five alternatives using a ranking based on an alternative's ability to meet the nine evaluation criteria. Table 7-4 provides a ranking of alternatives for each on the basis of the comparative analysis. The following sections describe how each alternative either does or does not meet the criteria.

Each of the five alternatives subjected to the detailed analysis was evaluated against the nine evaluation criteria identified under CERCLA. The criteria are subdivided into three categories: (1) threshold criteria that mandate overall protection of human health and the environment and compliance with ARARs; (2) primary balancing criteria that include long- and short-term effectiveness, implementability, reduction in toxicity, mobility or volume through treatment, and cost; and (3) modifying criteria that measure the acceptability of alternatives to state agencies and the community. The following sections summarize the evaluation of the five alternatives against the nine evaluation criteria.

7.3.1 Threshold Criteria

The remedial alternatives were evaluated in relation to the two threshold criteria: overall protection of human health and the environment, and compliance with ARARs. The selected remedial action must meet the threshold criteria. Although the No Action alternative does not meet the threshold criteria, this alternative was used in the detailed analysis as a baseline against which the other alternatives were compared, as directed by EPA guidance.

7.3.1.1 Overall Protection of Human Health and the Environment. This criterion addresses whether a remedy provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

Alternative 1 (No Action With Monitoring) would not satisfy the criterion of overall protection of human health and the environment because access to the site and contact with the waste are not prevented. Alternative 2 (Limited Action) would be effective for protecting human health and the environment. Institutional controls, including access restrictions, are regarded as reliable for at least 100 years following site closure. With the exception of mercury at the Chemical Waste Pond, COCs were determined to degrade to risk levels less than 1E-04 within 100 years. Therefore, no long-term human health risks will exist after that time. Institutional controls at the Chemical Waste Pond would have to be maintained permanently as the COC, mercury, does not degrade.

Regarding both the engineered barrier (Alternative 3a), and the native soil cover (Alternative 3b), each containment alternative involves the use of institutional controls (radiation surveys, cap integrity monitoring, and access restrictions) and surface water diversion controls. Surface water diversion controls will be maintained at least until the 100-year institutional control period expires. Alternative 3a (engineered barrier) is expected to be highly protective of human health and the environment for at least

Table 7-3. Comparative analysis summary of remedial alternatives for OU 2-13 sites of concern.

Criteria	Alternative 1 No Action (with monitoring)	Alternative 2 Limited Action	Alternative 3a Containment w/ Engineered Cover	Alternative 3b Containment w/Native Soil Cover	Alternative 4 Excavation, Treatment, and Disposal	Alternative 5 Excavation and Disposal
Overall Protection of Human Health and the Environment						
Human Health Protection	Risks are not reduced.	Is effective for duration of risk.	Inhibits direct exposure to contaminated soil for duration of unacceptable risk. Minimal exposure risk during cover construction.	Inhibits direct exposure to contaminated soil for duration of unacceptable risk. Minimal exposure risks during cover construction. Less resistance to erosion than engineered cover. Less effective than engineered cover for inhibiting biointrusion.	Eliminates potential exposure from contaminated soil at site. Protectiveness is based on completely removing contamination from the site. Short-term risk is moderate due to direct exposure during excavation.	Eliminates potential exposure from contaminated soil at site. Protectiveness is based completely on removing contamination from the site. Short-term risk is moderate due to direct exposure during excavation.
Environmental Protection	Allows migration of contaminated surface soil by wind and surface water erosion and provides little protection from exposure.	Risk reduction achieved.	Provides effective protection for duration of unacceptable risk. Minimal environmental impacts during construction. Inhibits intrusion by burrowing mammals and deep-rooted plants.	Provides moderate protection for duration of unacceptable risk. However, biointrusion into contaminated soils may result in exposure to contaminants. Minimal environmental impacts during construction.	Eliminates contamination from site and is therefore highly protective.	Eliminates contamination from the site and is therefore highly protective.
Compliance with ARARs						
Action-specific	Would not meet ARARs for fugitive dust emissions.	Meets ARARs for period of time when management and institutional controls in place.	Meets ARARs	Meets ARARs	Meets ARARs	Meets ARARs
Location-specific	Would not meet ARARs for control of stormwater discharge.	Meets ARARs for period of time when management and institutional controls in place.	Meets ARARs	Meets ARARs	Meets ARARs	Meets ARARs

Table 7-3. (continued).

Criteria	Alternative 1 No Action (with monitoring)	Alternative 2 Limited Action	Alternative 3a Containment w/ Engineered Cover	Alternative 3b Containment w/Native Soil Cover	Alternative 4 Excavation, Treatment, and Disposal	Alternative 5 Excavation and Disposal
Chemical-specific	Would not meet ARARs for groundwater protection standards and groundwater quality rules.	Meets ARARs for period of time when management and institutional controls in place.	Meets ARARs	Meets ARARs	Meets ARARs	Meets ARARs
To be considered	Would not satisfy DOE orders (i.e., radiation protection standards).	Satisfies DOE orders	Satisfies DOE orders	Satisfies DOE orders	Satisfies DOE orders	Satisfies DOE orders
Long-Term Effectiveness and Permanence						
Magnitude of residual risk	No change from existing risk	Source-to-receptor pathways eliminated while management and institutional controls remain in place.	Source-to-receptor pathways eliminated while cover remains in place.	Source-to-receptor pathways eliminated while cover remains in place.	No residual risk would remain at site as long as residuals <final remediation goals	No residual risk would remain at site.
Adequacy and reliability of controls	No control and, therefore, no reliability.	Effective for period of time when management and institutional controls in place (at least 100 years).	Limited access to contaminated soil and institutional controls effective at least 100 years. Barrier effective for duration of unacceptable risk.	Limited access to contaminated soil and institutional controls effective at least 100 years. Barrier effective for duration of unacceptable risk.	Effective provided mercury at TRA-06 is properly recycled.	Effective provided disposal facility provides adequate control over contaminated soil and sediment following excavation from the site.
Reduction of Toxicity, Mobility, or Volume through Treatment						
—	Not applicable	Not applicable	Not applicable	Not applicable	Greater than 90% of mercury recovered, volume of contaminated soil reduced by over 90%, mercury recovered and recycled, meets preference for treatment for those soils treated; not all soils will necessarily be treated.	Not applicable

Table 7-3. (continued).

Criteria	Alternative 1 No Action (with monitoring)	Alternative 2 Limited Action	Alternative 3a Containment w/ Engineered Cover	Alternative 3b Containment w/Native Soil Cover	Alternative 4 Excavation, Treatment, and Disposal	Alternative 5 Excavation and Disposal
			Short-Term Effectiveness			
Community protection	No increase in potential risks to the public.	No increase in potential risks to the public.	Minimal increase in potential risks to the public.	Minimal increase in potential risks to the public.	Slight increase in potential risks to the public if offsite transport of contaminants occurs.	Slight increase in potential risks to the public if offsite transport of contaminants occurs.
Worker Protection	Workers not protected, assuming existing administrative and institutional controls not in place.	Workers are protected by administrative and institutional controls.	Worker risk during barrier installation is minor because existing clean soil surface layers afford shielding.	Worker risk during barrier installation is minor because existing clean soil surface layers and installation of lowermost layer(s) afford shielding.	Worker risk from exposure to contaminated soil and sediment will require administrative/ engineering controls and excavation equipment modified for use in radioactively contaminated environments.	Worker risk from exposure to contaminated soil and sediment will require administrative/ engineering controls and excavation equipment modified for use in radioactively contaminated environments.
Environmental Impacts	Existing conditions are not impacted.	Existing conditions are not impacted.	Impacts would be limited to disturbances from vehicle and material transport activities associated with barrier construction. Limited potential for airborne contamination in the form of fugitive dust, because water sprays are used.	Impacts would be limited to disturbances from vehicle and material transport activities associated with barrier construction. Water sprays would be used to limit the potential for airborne contamination in the form of fugitive dust.	Impacts would be limited to disturbances from vehicle and material transport activities associated with barrier construction. Limited potential for airborne contamination in the form of fugitive dust, because water sprays are used.	Impacts would be limited to disturbances from vehicle and material transport activities associated with barrier construction. Limited potential for airborne contamination in the form of fugitive dust because water sprays are used.
			Implementability			
Time until action is complete	Not applicable	Currently implemented.	Will require approximately 12 to 15 months to complete action.	Will require approximately 12 to 15 months to complete action.	Will require approximately 18 to 24 months to complete action.	Will require approximately 12 to 15 months to complete action.

Table 7-3. (continued).

Criteria	Alternative 1 No Action (with monitoring)	Alternative 2 Limited Action	Alternative 3a Containment w/ Engineered Cover	Alternative 3b Containment w/Native Soil Cover	Alternative 4 Excavation, Treatment, and Disposal	Alternative 5 Excavation and Disposal
Ability to construct and operate	Not applicable	Currently implemented.	Involves available construction technology.	Involves available construction technology.	Difficult, involves available excavation and processing technology.	Somewhat difficult due to safety requirements.
Ease of implementing additional action if necessary	Feasibility study/record of decision process may need to be repeated.	Easily implemented.	Additional remedial actions would be difficult because the barrier is intended to prevent access to contamination. Therefore, the barrier would require removal.	Additional remedial actions would be difficult because the barrier is intended to prevent access to contamination. Therefore, the barrier would require removal.	Additional remedial action would not be necessary because all contaminated soil and sediment are removed.	Additional remedial action would not be necessary because all contaminated soil and debris are removed.
Ability to monitor effectiveness	Monitoring of conditions is readily implemented.	Monitoring of conditions is readily implemented.	Barrier performance can be monitored through radiation surveys; physical integrity can be visually assessed.	Barrier performance can be monitored through radiation surveys; physical integrity can be visually assessed.	The effectiveness in removing and treating all RCRA-hazardous contaminated materials associated with the site is easily determined.	The effectiveness in removing all contaminated materials associated with the site is easily monitored.
Ability to obtain approvals and coordinate with regulatory agencies	No approvals required.	No approvals required.	No difficulties identified.	No difficulties identified.	Difficult due to potential requirements for environmental assessments, safety analyses, and ARARs compliance.	Difficult due to potential requirements for environmental assessments, safety analyses, and ARARs compliance.
Availability of services and capacity	None required.	None required.	Barrier design and services exist within the DOE and are considered readily available to the INEEL.	Barrier design and services exist within the DOE and are considered readily available to the INEEL.	Services available either onsite or through subcontractor, recycling facility assumed available based on prior INEEL actions.	Services available either onsite or through subcontractor.

Table 7-3. (continued).

Criteria	Alternative 1 No Action (with monitoring)	Alternative 2 Limited Action	Alternative 3a Containment w/ Engineered Cover	Alternative 3b Containment w/Native Soil Cover	Alternative 4 Excavation, Treatment, and Disposal	Alternative 5 Excavation and Disposal
Availability of equipment, specialists, and materials	None required.	None required.	Equipment and materials are readily available at the INEEL or within the surrounding communities.	Equipment and materials are readily available at the INEEL or within the surrounding communities.	Equipment and materials are either available onsite or through subcontractors.	Equipment and materials are either available onsite, through subcontractors, or will be purchased. Trained specialists are available within the communities surrounding the INEEL.
Implementability of institutional controls	None required.	Easily accomplished because operational controls currently in place	Easily accomplished because operational controls currently in place. Materials and services exist at the INEEL to invoke additional controls if necessary.	Easily accomplished because operational controls currently in place. Materials and services exist at the INEEL to invoke additional controls if necessary.	Easily accomplished because operational controls currently in place. Materials and services exist at the INEEL to invoke additional controls if necessary.	None required
Availability of technology	None required.	None required.	Technology is readily available at the INEEL.	Technology is readily available at the INEEL.	Technology is available through subcontractors.	Readily available at the INEEL.
Costs	See Table 9-2	See Table 9-2	See Table 9-2	See Table 9-2	See Table 9-2	See Table 9-2

Table 7-4. Relative ranking of alternatives evaluated for the eight OU 2-13 sites of concern.

Evaluation Criteria	Warm Waste Pond (TRA-03)	Chemical Waste Pond (TRA-06)	Cold Waste Pond (TRA-08)	Sewage Leach Pond (TRA-13)	Soil Surrounding Hot Waste Tanks at Building 613 (TRA-15)	Soil Surrounding Tanks 1 and 2 at Building 630 (TRA-19)	Brass Cap Area	Sewage Leach Pond Berm and Soil Contamination Area
Overall protection of human health and the environment	5, 3a, 3b, 1	5, 4, 3a, 3b, 1	5, 3a, 3b, 1	5, 3a, 3b, 1	5, 2, 3a, 1	5, 3a, 1	5, 3a, 1	5, 2, 1
Compliance with ARARs	3a, 3b, 5	4, 3a, 3b, 5,	3a, 3b, 5	3a, 3b, 5	2, 3a, 5	3a, 5	3a, 5	2, 5
Long-term effectiveness and permanence	5, 3a, 3b, 1	4, 5, 3a, 3b, 1	5, 3a, 3b, 1	5, 3a, 3b, 1	2, 5, 3a, 1	5, 3a, 1	5, 3a, 1	5, 2, 1
Reduction of toxicity, mobility, or volume through treatment	N/A	4	N/A	N/A	N/A	N/A	N/A	N/A
Short-term effectiveness	1, 3b, 3a, 5	1, 3b, 3a, 5, 4	1, 3b, 3a, 5	1, 3b, 3a, 5	1, 2, 3a, 5	1, 3a, 5	1, 3a, 5	1, 2, 5
Implementability	1, 3b, 3a, 5	1, 3b, 3a, 5, 4	1, 3b, 3a, 5	1, 3b, 3a, 5	1, 2, 3a, 5	1, 3a, 5	1, 3a, 5	1, 2, 5
Cost	1, 3a, 3b, 5	5, 1, 3b, 3a , 4	5, 1, 3b, 3a	1, 3b, 3a, 5	1, 2, 3a, 5	5, 1, 3a	5, 1, 3a	1, 5, 2

Note: The order of the listed alternatives, for each site of concern, is the relative ranking from best to worst in meeting the CERCLA evaluation criteria (e.g., when considering the Warm Waste Pond, for "Overall protection of human health and the environment" the highest ranked alternative is "containment with an engineered cover" (3a), and the lowest ranked alternative is "No Action" (1).

Alternative 1	=	No Action
Alternative 2	=	Limited Action
Alternative 3a	=	Containment w/engineered cover
Alternative 3b	=	Containment w/native soil cover
Alternative 4	=	Excavation, treatment (mercury retort) and disposal
Alternative 5	=	Excavation and Disposal

the length of time an unacceptable risk is posed at the OU 2-13 buried soil and disposal sites. The engineered cover ensures long-term protection because it uses natural construction materials approximately 4 ft thick. Functional requirements of this cover would include inhibiting human and biotic intrusion, as well as meeting other RAOs. The thickness of this barrier would be more than sufficient to shield against penetrating radiation above background levels. Furthermore, this barrier would be designed to inhibit inadvertent human intrusion, and resist erosion from wind and surface water runoff. This barrier would also inhibit biotic intrusion, thereby controlling exposure pathways to environmental receptors. The native soil cover (Alternative 3b) is designed for long-term isolation of waste with minimal maintenance requirements. The cover surface would provide erosion control, and the cover soil thickness would inhibit biointrusion into contaminated soil. However, the potential would exist for deep-rooting vegetation or burrowing invertebrates to mobilize radionuclides into the environment.

Alternative 4 (excavation, treatment, and disposal) involves excavation of mercury-contaminated soils and pond sediments at the Chemical Waste Pond, treatment in a mercury retort, and return of clean soils to the disposal pond. For the purposes of this evaluation, it is assumed that all pond sediments would fail the TCLP and require treatment. This alternative provides highly effective, long-term protection of human health and the environment. The removal of all mercury-contaminated soils from the Chemical Waste Pond would eliminate potential long-term human health and environmental concerns associated with future exposure of mercury migration from the pond. Recycling and/or reuse by an approved and permitted industrial facility is assumed to ensure complete elimination of risks to human health and the environment at this site.

Finally, excavation and disposal (alternative 5) provides highly effective, long-term protection of human health and the environment. The removal of all contaminated soil from OU 2-13 sites of concern would eliminate potential long-term human health and environmental concerns associated with future exposure of contaminant migration from uncontrolled radioactive waste disposal sites. This alternative is also environmentally protective during implementation, based on the contamination mitigation activities that would be used to prevent contaminant migration during excavation activities. However, short-term protection of human health is less effective because workers would receive direct exposure to contaminated soil and debris during excavation.

7.3.1.2 Compliance with Applicable or Relevant and Appropriate Requirements. While the No Action alternative does not involve any construction or operational activities that would result in disturbances to the surfaces of the OU 2-13 sites, most ARARs and To Be Considered (TBC) requirements for the eight sites identified as having unacceptable risks or adverse noncarcinogenic health effects would not be met under this alternative. Table 7-3 shows which ARARs would not be met under this alternative. Most ARARs and TBCs would be met under the Limited Action alternative, with the exception of Idaho Fugitive Dust Emission (IDAPA 16.01.01.650 et seq) requirements and Storm Water Discharge regulations (40 CFR 122.26). While the Limited Action alternative does not involve any construction or operational activities that would result in disturbances to the surfaces of the OU 2-13 sites, IDAPA 16.01.01.650 could nonetheless apply to the existing Warm Waste Pond cells if they were a source of fugitive dust and is, therefore, considered an ARAR that would not be met. The ARARs pertaining to current workers are met through administrative controls in place at TRA; these controls would remain in effect during the institutional period (at least 100 years). If metals and SVOCs were present in fugitive dust, then IDAPA 16.01.01.585-586 are ARARs that would not be met.

All ARARs and TBCs would be met under the containment alternatives (Alternatives 3a and 3b). Containment actions, including the use of institutional controls, would reduce the external exposure risk associated with contaminated soil left in place at disposal ponds and subsurface release sites. Alternative 4 involves excavation, treatment, and disposal at the Chemical Waste Pond (TRA-06) only. This alternative satisfies all ARARs and TBCs, provided proper engineering controls (i.e., dust suppression and retort emissions control) are followed during excavation and treatment. Excavation and disposal (Alternative 5) would comply with all ARARs and TBCs. Compliance with the emissions control ARARs would be ensured by performing excavation using water sprays and other techniques for dust suppression, as needed.

Recent investigations have determined that RCRA-listed waste may have been present in the TRA warm and hot waste systems when leaks from the systems to the environment occurred. Therefore, soils at those sites associated with releases from the warm and hot waste systems will be managed in a manner consistent with the hazardous waste determination to be performed at the time of the remedial action.

7.3.2 Balancing Criteria

Once an alternative satisfies the threshold criteria, five balancing criteria are used to evaluate other aspects of the remedial alternatives and weigh major tradeoffs among alternatives. The balancing criteria are used in refining the selection of the candidate alternatives for the site. The balancing criteria are: (1) long-term effectiveness and permanence; (2) reduction in toxicity, mobility, or volume through treatment; (3) short-term effectiveness; (4) implementability; and (5) cost.

7.3.2.1 Long-Term Effectiveness and Permanence. This criterion evaluates the long-term effectiveness of alternatives in maintaining protection of human health and the environment after remedial action objectives have been met.

Alternative 1 (No Action With Monitoring) provides the least possible level of long-term effectiveness and permanence because unacceptable risks would remain at the sites. The long-term effectiveness and permanence of the Limited Action alternative (Alternative 2) is considered high as long as administrative and institutional controls are in place to prevent human exposure to contaminated surface soil. Alternatives 3a and 3b (containment alternatives and institutional controls) involve the installation of either an engineered barrier or a native soil cover. Cap integrity monitoring and survey programs would be implemented annually for the first 5 years following completion of the cap, and additional monitoring requirements would be evaluated during subsequent 5-year reviews. Therefore, the long-term effectiveness and permanence requirements are met by these alternatives. Each capping technology is designed to resist erosion because of wind and surface water runoff and to resist biointrusion into the contaminated soil. The design of the engineered cover provides greater permanence and lower maintenance. The native soil cover would be more susceptible to erosion and biointrusion and would require more maintenance and monitoring than the engineered cover. Based on direct exposure reduction requirements, the Warm Waste Pond 1952 and 1957 cells would require long-term effectiveness and permanence for a period of at least 270 years. Both containment designs would meet this requirement.

Alternative 4 (excavation, treatment, and disposal) at the Chemical Waste Pond has a high potential for achieving long-term effectiveness and permanence because soil contaminated greater than TCLP levels is completely removed, treated, and used as clean backfill in the excavation. Alternative 5 (excavation and disposal) has the highest potential for achieving long-term effectiveness and permanence because contaminated soil is completely removed from the site. This would reduce or eliminate the need for long-term monitoring and maintenance and would likely eliminate the need for other institutional controls such as fencing and deed restrictions.

7.3.2.2 Reduction of Toxicity, Mobility, or Volume Through Treatment. This criterion addresses the statutory preference for selecting remedial actions that employ treatment technologies that permanently reduce toxicity, mobility, or volume of the hazardous substances as their principal elements. Treatment to reduce the toxicity of radionuclides is presently not feasible. Therefore, none of the remedial alternatives, with the exception of excavation, treatment, and disposal of mercury contaminated soil at the Chemical Waste Pond, involves the use of treatment to reduce the toxicity, mobility, or volume of contaminated materials. At the Chemical Waste Pond, it is expected that treatment would reduce the toxicity, mobility, and volume to acceptable levels, if treatment were deemed necessary.

7.3.2.3 Short-Term Effectiveness. Short-term effectiveness addresses the time needed to implement remediation methods to reduce any adverse impacts on human health and the environment that may be posed during the construction and implementation period until cleanup goals are achieved.

The short-term effectiveness for any remedial action taken at the TRA would be enhanced to the maximum extent practicable through adherence to strict health and safety protocols for worker protection and use of engineering controls to prevent potential contaminant migration. However, the alternative that provides the least amount of disturbance to contaminated materials ranks the highest in terms of short-term effectiveness. As such, Alternative 1 (No Action With Monitoring) provides the highest degree of short-term effectiveness because no additional onsite activities are required. The Limited Action (Alternative 2) alternative is already implemented at TRA through radiation control and fences, signs, and radiation monitoring; as a result, short-term effectiveness is considered high. No specialized equipment, personnel, or services are required to continue this alternative. Natural decay of radionuclides over time would reduce the environmental and human health risk. Short-term effectiveness criteria for the containment alternatives (Alternatives 3a and 3b) are met because exposure to construction workers during installation of the cover would be minimized. Inhalation and ingestion risks would be minimized by the use of appropriate protective equipment, engineering controls, and adherence to health and safety protocol, including the DOE as-low-as-reasonably-achievable approach to radiation protection.

Risks from transportation would be low because of the likelihood of obtaining construction materials from local sources. Environmental impacts during construction activities would be minimal. The activities would occur within previously disturbed areas. The remoteness of the TRA site would prevent any impact to surrounding communities during construction activities. Short-term effectiveness of Alternative 4 (excavation, treatment, and disposal) at the Chemical Waste Pond is considered relatively high provided administrative and engineering controls are properly conducted. Equipment-operator exposures would be minimized to the extent practicable. Environmental impacts for this alternative are minimal and are similar to those for the excavation and disposal alternative. The RAOs would be achieved by this alternative once excavation, treatment, and disposal of treated soil is complete. Alternative 5 (excavation and disposal) offers the least short-term effectiveness because of direct contact with contaminated materials during excavation and transportation of the disposal facility. However, radiation controls and monitoring would be implemented to mitigate these risks.

Equipment-operator exposures would be minimized to the extent practicable through shielding, use of supplied air, air filters, and other engineering controls (i.e., dust suppression). In addition, exposure could be reduced through reduction in the amount of time spent at the site by any one worker. Some environmental disturbance is likely to occur in the area surrounding the excavation and haulage route. However, these impacts would be temporary and restoration of disturbed areas would occur following completion of construction activities. The RAOs would be achieved by this alternative once excavation and disposal are complete.

7.3.2.4 Implementability. The implementability criterion has the following three factors requiring evaluation: (1) technical feasibility, (2) administrative feasibility, and (3) the availability of services and materials. Technical feasibility requires an evaluation of the ability to construct and operate the technology, the reliability of the technology, the ease of undertaking additional remedial action (if necessary), and monitoring considerations. The ability to coordinate actions with other agencies is one factor for evaluating administrative feasibility, and the agencies have demonstrated this ability throughout the project to date. Other administrative activities that would be readily implementable include planning, use of administrative controls, and personnel training. In terms of services and materials, an evaluation of the following availability factors is required: necessary equipment and personnel, prospective technologies, and cover materials.

Alternative 1 (No Action With Monitoring) is the simplest remedial action to implement from a technical perspective because environmental monitoring is all that may be required. If required, monitoring would be performed until future reviews of the remedial action indicate that such activities are no longer necessary. Environmental monitoring services and equipment are readily available. However, Alternative 1 is administratively unacceptable because of the potential risks to human health and the environment posed by the TRA sites of concern. Implementability for Alternative 2 (Limited Action) is high because most administrative and institutional controls are already in place and access to contaminants is currently restricted. The containment alternatives (Alternatives 3a and 3b) are readily implementable based on local sources of materials, conventional construction equipment and methods, and easily implemented institutional controls, including long-term monitoring, cap integrity monitoring, access restrictions and surface water runoff control. Long-term activities following cover construction would include radiation surveys, annual review of cover integrity, institutional controls for 5 years, and subsequent 5-year reviews. Containment activities have been successfully implemented in other areas of the INEEL. At the Chemical Waste Pond, Alternative 4 (excavation, treatment, and disposal) is readily implementable.

Treatment of mercury-contaminated soils has been previously demonstrated to be effective at the INEEL and at identified industrial facilities willing to take recovered mercury. Alternative 5 (excavation and disposal) would be moderately difficult to implement because of the complexity of the retrieval system with respect to safety considerations and containment requirements. Significant effort would be required to perform environmental assessments, safety analyses, and equipment modifications (for operator safety), as well as system testing and demonstration. Although the equipment and technology are available to perform the activities specified in this alternative, increased risks to workers during excavation result in lower implementability relative to other alternatives.

7.3.2.5 Cost. In evaluating project costs, an estimation of the direct and indirect costs in present worth dollars is required. Present worth costs are estimated assuming variable annual inflation factors for the first 10 years, and a constant 5% annual inflation rate after that. A constant 5% discount rate is assumed. Direct costs include the estimated dollars for equipment, construction, and operation activities to conduct a remedial action. Indirect costs include the estimated dollars for activities that support the remedial action (such as construction management, project management, and management reserve). In accordance with the RI/FS study guidance, the costs presented in Table 9-2 are estimates (-30 to +50%). Actual costs will vary based on the final design and detailed cost itemization.

The costs associated with Alternative 1 (No Action With Monitoring) involve only radiation surveys. Post-closure costs were estimated for the full duration of the 100-year period of monitoring. The costs associated with Alternative 2 (Limited Action) involve only radiation surveys and maintaining existing fences, such as the one located at the Sewage Leach Pond Soil Contamination Area. For Alternatives 3a (engineered barrier) and 3b (native soil cover) the cost estimate is based on constructing the engineered and native soil cover, installing surface water diversion controls, using monitoring equipment, conducting analyses, and post-closure maintenance and monitoring. Costs for the native soil cover are lower than for the engineered cover because of the simple design. At the Chemical Waste Pond, costs associated with excavation, treatment, and disposal are considered moderate. The estimated cost for Alternative 5 (excavation and disposal) is relatively high. The implementation requirements significantly increase the cost associated with this alternative. No post-closure monitoring or care is required because the contaminants will be removed.

7.4 Modifying Criteria

The modifying criteria, state and community acceptance, are used in the final evaluation of remedial alternatives. For both of these criteria, the factors include the elements of the alternatives that are supported, the factors of the alternatives that are not supported, and the elements of the alternatives that have strong opposition.

7.4.1 State Acceptance

The IDHW has been involved in the development and review of the RI/FS report, the Proposed Plan, and this ROD. All comments received from IDHW on these documents have been resolved and incorporated into these documents accordingly. In addition, IDHW has participated in public meetings where public comments and concerns have been received and responses offered.

The IDHW concurs with the selected remedial alternatives for the sites contained in this ROD and is signatory to the ROD with DOE and EPA.

7.4.2 Community Acceptance

Community participation in the remedy selection process includes participation in the public meetings held in March 1997 and review of the Proposed Plan during the public comment period of March 10, 1997 through May 9, 1997. Community acceptance is summarized in the Responsiveness Summary presented as Appendix A of this document. The Responsiveness Summary includes comments received either verbally or in writing from the public, and the agencies' responses to these comments.

A total of about twenty people not associated with the project attended the Proposed Plan public meetings. Overall, twenty citizens provided formal comments; of these, six citizens provided verbal comments, and fourteen provided written comments. All comments received on the proposed plan were considered during the development of this ROD.

As can be seen in the Responsiveness Summary, the ROD was substantively modified and improved in response to comments made by the public. Comments were often incorporated directly or were modified and included in the decision. In other cases, the modifications were made to the document to add greater explanation as to why a comment could not be incorporated.

In addition to their direct impact on the decision and the document, public comments triggered focused review of the sections highlighted by each commentor. The DOE, EPA, and the State review of these sections and the document as a whole resulted in further modifications and improvements to the decision. The agencies appreciate the public's participation in this process and acknowledge the value of public comment.

8. SELECTED REMEDY

The results of investigations at OU 2-13, WAG 2, TRA, at INEEL indicate that eight sites exceed a 1 in 10,000 risk or greater than 1.0 hazard index (indicates adverse noncarcenogenic health effects) to human health and/or the environment and thus pose an unacceptable risk; 47 sites do not exceed a 1 in 10,000 risk and therefore require no action. Please note that there are no unacceptable cumulative effects from the eight sites, and the remedial actions being recommended address individual risks as well as preventing cumulative risks to a future residential receptor at WAG 2. Based on consideration of the requirements of CERCLA, the detailed analysis of alternatives, and public comments, DOE-ID, EPA, and IDHW have selected the following alternatives for the sites contained in this ROD (Table 8-1).

Table 7-3 provides a summary of how the selected remedy for each ranks relative to one another. This comparative analysis provides a measure of the relative performance of alternatives against each evaluation criterion. The purpose of this comparison is to identify the relative advantages and disadvantages associated with each alternative.

8.1 Description of Selected Remedy

The selected remedies for each are described in the following sections.

8.1.1 Warm Waste Pond (TRA-03)

The selected remedy for the Warm Waste Pond 1952 and 1957 cells is Alternative 3a (containment with an engineered cover and institutional controls). This alternative was found to provide the greatest level of protectiveness to human health and the environment and had substantially lower costs than the excavation and disposal alternative. Implementation of the engineered cover is slightly more difficult than the native soil cover alternative, but the engineered cover provides greater permanence and requires less maintenance. Because contaminants are being left in place, institutional controls will be required to remain for the length of time that the contaminants pose an unacceptable risk to human health or the environment (at least 100 years). These institutional controls are to include soil cover integrity monitoring and maintenance, surface water diversions, access restrictions, and long-term environmental monitoring. Institutional controls are assumed to remain in effect for at least 100 years. Five-year reviews will be used to ensure that the remedy remains protective and appropriate. Before placement of the final cover, the 1957 cell may be filled to grade with CERCLA-contaminated soils from surrounding INEEL sites. As approved by the agencies, all soils used to fill the Warm Waste Pond to grade will have to be consistent with what has been placed to date in the 1957 cell in terms of contaminant type and concentration.

This alternative will reduce human exposure by preventing direct contact with and exposure to contaminants and will inhibit or eliminate potential intrusion of contaminated soils by both human and ecological receptors (i.e., burrowing mammals and deep-rooted vegetation). Under this alternative, groundwater monitoring will be continued to ensure that groundwater concentrations do not increase to unacceptable levels and that modeling predictions remain valid.

For the 1964 cell, where previous interim remedial action has already been completed, a basalt riprap or cobble gravel layer will be placed on top of the current native soil surface to inhibit intrusion or future excavation at the and to increase the permanence of the remedy.

Table 8-1. Selective remedial alternatives for sites of concern in OU 2-13.

	Selected Remedy
Warm Waste Pond (TRA-03) 1952 and 1957 cells	Containment with an engineered cover and institutional controls
Warm Waste Pond 1964 cell	Final basalt riprap or cobble gravel layer on existing native soil cover and institutional controls
Chemical Waste Pond (TRA-06)	Native soil cover and institutional controls, with possible excavation, treatment, and disposal
Cold Waste Pond (TRA-08)	Excavation and disposal
Sewage Leach Pond (TRA-13)	Containment with a native soil cover and institutional controls
Soil Surrounding Hot Waste Tanks at Building TRA-613 (TRA-15)	Limited Action for at least 100 years
Soil Surrounding Tanks 1 and 2 at Building TRA-630 (TRA-19)	Limited Action with implementation of a contingent excavation and disposal option
Brass Cap Area	Limited Action with implementation of a contingent excavation and disposal option
Sewage Leach Pond Berms and Soil Contamination Area	Limited Action for at least 100 years; berms will be placed in the floor of the Sewage Leach Pond

Performance standards will be implemented to ensure that the engineered cover provides protection against direct exposure to the contaminated waste. These standards are described in Section 8.2.

Recent investigations have determined that RCRA-listed waste may have been present in the TRA warm waste system when discharges from the warm waste system to the pond occurred. In addition, soil placed in the Warm Waste Pond from Test Area North (TAN) during the OU 10-06 removal action may have been contaminated with RCRA-listed waste. Therefore, the Warm Waste Pond soils will be managed in a manner consistent with the hazardous waste determination to be performed at the time of the remedial action. Any final determination to be made in regard to management of these soils will be pursued within time frames capable of supporting the schedule to be established in the RD/RA Scope of Work.

The soil from TAN placed in the TRA Warm Waste Pond during the OU 10-06 removal action may have been contaminated with low levels of PCBs. This soil was analyzed for PCBs; however, none were detected. The maximum detection limit of the data set was 0.220 ppm. The agencies have determined that these soils need not be managed as PCB-contaminated soil since the residual PCB levels are below the OSWER directive guidance level of 25 ppm at superfund sites.

In summary, the containment remedy for the Warm Waste Pond is protective of human health and the environment, complies with ARARs, provides short- and long-term effectiveness, is readily and is cost effective. The engineered cover design has been shown to be effective at other sites contaminated with radionuclides. Institutional controls will be implemented as described in Section 7.2.2.

8.1.2 Chemical Waste Pond (TRA-06)

The selected remedy for the Chemical Waste Pond is Containment with a Native Soil Cover and Institutional Controls with Possible Excavation, Treatment, and Disposal. The need for excavation, treatment and disposal will be determined on the basis of additional sampling to be performed during the remedial design phase. The agencies have concurred that excavating and disposing of contaminated sediments in the bottom of the pond before filling the pond to grade or constructing a native soil cover will meet the cleanup goals for the Chemical Waste Pond. However, it is not clear which is most cost effective. Cost effectiveness is dependent on the amount of soil that would need to be excavated and the requirements for its management as well as the design of the cover. If only small amounts of contaminated soil would need to be excavated and disposed, and the level of mercury in that soil is below levels that would require treatment, then excavation and disposal would likely be more cost effective. This is because the disposal cost would be low, the pond could be filled to grade with minimal backfill specifications, and long-term monitoring and maintenance needs would be eliminated. If larger amounts of soils would need to be excavated and disposed to meet cleanup goals, and the levels of mercury in the soil would require treatment by stabilization or retorting to meet hazardous waste regulations, then the soil cover would be the more cost-effective remedy. However, if the contamination is left in place, the cover would require more strict specifications to enhance runoff and reduce erosion. In order to make the final determination, further sampling and analysis needs to be completed in the pond to define the amount of soils that would require excavation and how the soil would have to be managed (i.e., soils contaminated with mercury above 260 mg/kg must be treated by retorting the soil if excavated and thereby generated as hazardous waste). Therefore, the specific design of the remedy selected in this ROD, native soil cover with possible excavation and disposal after sampling, will be dependent upon the results of a sampling and analysis effort as a first step after signature of the ROD but before the final design is completed.

If contaminants are left in place, the final cover design will consist of a sloped surface with a 1-ft peak similar to that depicted in Figure 7-1. Environmental monitoring and institutional controls would be maintained for at least 100 years. Institutional controls and access restrictions as described in Section 7.3.2 will be required. Five-year reviews will be used to evaluate the effectiveness and appropriateness of this alternative.

Performance standards will be implemented to ensure that the native-soil cover provides protection against direct exposure to the contaminated wastes. These standards are described in Section 8.2.

8.1.3 Cold Waste Pond (TRA-08)

The selected alternative for the Cold Waste Pond is Alternative 5, Excavation and Disposal. Costs for this alternative were lower due to the estimated amount of contaminated sediment requiring removal [0 to 6 in. (0 to 15 cm)] versus the amount of fill materials that would be required under the two containment options (Alternatives 3a and 3b). It is anticipated that a hot spot removal will be performed on the basis of field measurements and laboratory data collected. This alternative provides the highest degree of long-term effectiveness and permanence. Only sediments with contaminant concentrations exceeding risk-based cleanup goals will be excavated and appropriately disposed.

Performance standards will be implemented to ensure that the excavation and disposal of contaminated soil provide protection against direct exposure to the contaminated wastes. These standards are described in Section 8.2.

8.1.4 Sewage Leach Pond (TRA-13)

The selected alternative for the Sewage Leach Pond is Alternative 3b (containment with a native soil cover and institutional controls, as described above). Institutional controls will be required to remain for the length of time that the contaminants pose an unacceptable risk to human health or the environment (at least 100 years). Before the barrier is constructed, the pond will initially be backfilled with soils from the contaminated berms, then filled with clean soil to grade. This will ensure that any contamination from the berms is placed in the bottom of the pond. The final cover design will consist of a sloped surface with a 1-ft peak. The cover surface would be completed with a gravel mulch and vegetated with crested wheatgrass. The slope surface would be used to divert surface water runoff and to promote evapotranspiration. This alternative would effectively reduce risks to human health and the environment at relatively low implementation costs compared to excavation and disposal. The native soil cover effectively reduces the potential for human and environmental exposure to contaminants but requires long-term monitoring and maintenance to ensure that migration of contaminants to receptor pathways does not occur. This alternative was compared and selected based on remedy selection criteria as described in Section 7.3. Five-year reviews will be used to evaluate the effectiveness and appropriateness of this alternative.

Performance standards will be implemented to ensure that the native-soil cover provides protection against direct exposure to the contaminated wastes. These standards are described in Section 8.2.

8.1.5 Soil Surrounding Hot Waste Tanks at Building 613 (TRA-15)

The selected alternative for the soil surrounding Hot Waste Tanks at Building 613 is Alternative 2, Limited Action, because risk estimates are only slightly above criteria for current and future workers. Existing administrative and institutional controls will continue to be used to be protective of occupational scenarios. These controls would be maintained for a period of 100 years. Performance standards will be implemented to ensure protection against direct exposure to the contaminated wastes while the site is under institutional control. At the end of 100 years, no other action will be required because radioactive decay of contaminants will have occurred to levels that no longer represent an unacceptable risk to human health and the environment.

8.1.6 Soil Surrounding Tanks 1 and 2 at Building 630 (TRA-19)

The selected alternative for the Soil Surrounding Tanks 1 and 2 at Building 630 is Alternative 2 (Limited Action), with the contingency that if controls established under the Limited Action are not maintained then an Excavation and Disposal option would be implemented. Recent investigations have determined that RCRA-listed waste may have been present in the TRA warm and hot waste systems when leaks from the systems to the environment occurred. If soil is excavated for disposal, a hazardous waste determination will be required. Therefore, the TRA-19 soils will be managed in a manner consistent with the hazardous waste determination to be performed at the time of excavation and disposal. Excavation would occur to a maximum depth of potential intrusion [10 ft (3 m) or the maximum depth at which contaminant concentrations exceed PRGs, whichever is less]. The excavated soil will be transported to an approved disposal facility. This alternative was selected on the basis of long-term effectiveness, permanence, and costs that are roughly equivalent to those for Alternative 3a, containment with an engineered cover.

This alternative is selected because the contamination associated with these two sites is located under the ground surface in and around active radioactive waste piping and tank systems and buildings where access is physically limited. Therefore, excavation or containment alternatives are not fully implementable at this time, because it cannot be ensured that adequate contamination could be removed to eliminate the need for the controls that would be in place under the Limited Action alternative. If during 5-year reviews it is determined that the controls established under the Limited Action alternative are not maintainable or do not continue to be protective, the contingency of Excavation and Disposal would be implemented. Selection of the Limited Action alternative in this ROD would require that existing controls such as access restrictions and worker protection programs be maintained to prevent exposure above acceptable levels to workers or future inhabitants.

The identification of Limited Action as the preferred alternative, with an Excavation and Disposal option contingency, is based on the 100-year industrial land use assumption for TRA. The validity of this assumption will be evaluated during the 5-year review process. However, the maximum duration of time for which this assumption may be considered valid is up to 100 years from now.

Performance standards will be implemented to ensure protection against direct exposure to the contaminated wastes while the site is under institutional control. When excavation and disposal take place at some point in the future, the performance standards described in Section 8.2 will be implemented to ensure that excavating and disposal activities provide protection against direct exposure to the contaminated wastes.

8.1.7 Brass Cap Area

As with TRA-19, the selected alternative is Limited Action, with the contingency that, if controls established under the Limited Action are not maintained then an Excavation and Disposal option would be implemented. This alternative provides long-term effectiveness, permanence, and reasonable costs when compared with the other remedies evaluated.

This consists of radioactively contaminated soil located below the ground surface inside the security fence at TRA. The source of contamination is attributed to a leaking warm waste line; however, it is acknowledged that possible releases from a nearby hot waste line may have occurred and that this contamination may not be readily distinguishable from any warm waste line releases. Some contaminated soil and concrete were excavated and removed during repair of the leaking line. The excavation was backfilled with clean soil, and the concrete surface was replaced. Recent investigations have determined that RCRA-listed waste may have been present in the TRA warm and hot waste systems when leaks from the systems to the environment occurred. If soil is excavated for disposal, a hazardous waste determination will be required. Therefore, the Brass Cap Area soils will be managed in a manner consistent with the hazardous waste determination to be performed at the time of excavation and disposal.

The identification of Limited Action as the preferred alternative, with an Excavation and Disposal option contingency, is based on the 100-year industrial land use assumption for TRA. The validity of this assumption will be evaluated during the 5-year review process. However, the maximum duration of time for which this assumption may be considered valid is up to 100 years from now.

Performance standards will be implemented to ensure protection against direct exposure to the contaminated wastes while the is under institutional control. When excavation and disposal take place at some point in the future, the performance standards described in Section 8.2 will be implemented to ensure that excavating and disposal activity provides protection against direct exposure to the contaminated wastes.

8.1.8 Sewage Leach Pond Berm and Soil Contamination Area

The selected remedy for the Sewage Leach Pond Berms and Soil Contamination Area is Alternative 2 (Limited Action), consisting of existing administrative and institutional controls. As previously described in Section 8.1.4 for the Sewage Leach Pond (TRA-13), the contaminated berms will be placed in the bottom of the pond before completion of the final clean, native soil cover. The remaining low-level radionuclide-contaminated soils will be left in place, and exposure to these contaminants will be minimized through the use of fences, signs, and monitoring (i.e., field measurement surveys). Institutional controls will be maintained for a period of at least 100 years. This will be protective of occupational scenarios while achieving acceptable risks within 100 years because of natural radioactive decay. A CERCLA 5-year review will be conducted to ensure that the administrative controls are being properly maintained and that the predicted decrease in contaminant concentrations does occur.

8.1.9 No Action Site

The No Action alternative was reaffirmed or selected as the appropriate alternative for the 47 sites at TRA listed below. This alternative was chosen because there are no known or suspected contaminant releases, contaminants exceeding acceptable levels, or previous cleanups resulting in unacceptable risks to human health and the environment. For this reason, long-term environmental monitoring is not warranted for these sites.. It should be noted that the eliminated No Action sites do not pose a risk in combination.

Operable Unit—None

- TRA-10 TRA MRT Construction Excavation Pile
- TRA-23 TRA ETR Excavation Rubble Pile
- TRA-24 TRA Guardhouse Construction Rubble Pile
- TRA-25 TRA Sewer Paint Settling Pond Rubble Pile
- TRA-26 TRA Rubble by USGS Observation Well
- TRA-27 TRA North Storage Area Rubble Pile
- TRA-28 TRA North (Landfill) Rubble
- TRA-29 TRA ATR Construction Pile
- TRA-32 TRA West Road Rubble Pile
- TRA-33 TRA West Staging Area/Drainage Ditch Rubble

Operable Unit 2-01

- TRA-02 TRA Paint Shop Ditch

Operable Unit 2-02

- TRA-14 TRA Inactive Gasoline Tank at TRA-605

- TRA-17 TRA Inactive Gasoline Tank at TRA-616
- TRA-18 TRA Inactive Gasoline Tank at TRA-619
- TRA-21 TRA Inactive Tank, North Side of MTR-643
- TRA-22 TRA Inactive Diesel Fuel Tank at ETR-648

Operable Unit 2-03

- None TRA-614 Oil Storage North
- TRA-01 TRA Acid Spill Disposal Pit
- TRA-11 TRA French Drain at TRA-645
- TRA-12 TRA Fuel Oil Tank Spill (TRA-727B)
- TRA-20 TRA Brine Tank (TRA-731) at TRA-631
- TRA-40 TRA Tunnel French Drain (TRA-731)

Operable Unit 2-04

- None TRA PCB Spill at TRA-619
- None TRA PCB Spill at TRA-626
- None TRA-627 #5 Oil Spill
- None TRA PCB Spill at TRA-653
- None TRA-670 Petroleum Product Spill
- None TRA PW 13 Diesel Fuel Contamination
- TRA-09 TRA Spills at TRA Loading Dock (TRA-722)
- TRA-34 TRA North Storage Area

Operable Unit 2-05

- None TRA-603/605 Tank
- TRA-16 TRA Inactive Radionuclide Contaminated Tank at TRA-614

Operable Unit 2-06

- TRA-30 TRA Beta Building Rubble
- TRA-31 TRA West Rubble
- TRA-35 TRA Rubble East of West Road near Beta Building Rubble Pile

Operable Unit 2-07

- None TRA-653 Chromium-Contaminated Soil

Operable Unit 2-08

- TRA-37 TRA MTR Canal in basement of TRA-603

Operable Unit 2-09

- TRA-07 TRA Sewage Treatment Plant (TRA-624) and Sludge Pit (TRA-07)

Operable Unit 2-10

- TRA-03B TRA Warm Waste Pond (Sediments)

Operable Unit 2-11

- TRA-03A TRA Warm Waste Leach Pond (TRA-758)
- TRA-04 TRA Warm Waste Retention Basin (TRA-712)
- TRA-05 TRA Waste Disposal Well, Sampling Pit (764) and Sump (703)

Operable Unit 2-12

- None Perched Water RI/FS

Operable Unit 2-13

- TRA-41 French Drain
- TRA-42 Diesel Unloading Pit
- None Hot Tree
- None ETR Stack Area

The agencies concur with the No Action alternative selected for the above-listed sites.

For those sites for which no action is being taken based on land use assumptions, those assumptions will be reviewed as part of the 5-year review. In addition, legacy waste that has been generated as a result of previous sampling activities at WAG 2 (i.e., investigation-derived waste) will be appropriately characterized, assessed, and dispositioned in accordance with regulatory requirements to achieve remediation goals consistent with remedies established for sites under this ROD.

8.2 Remediation Goals

The purpose of this response action is to inhibit potential exposure for human and environmental receptors and to minimize the spread of contamination. For the majority of disposal pond sites, this will be accomplished by constructing long-term covers (caps) and restricting access to the sites. For the subsurface release sites, this will be primarily accomplished by eventual excavation and disposal of the contaminated soils. For the remaining sites, this will be accomplished through institutional controls.

8.2.1 Containment System Performance Standards

Performance standards will be implemented to ensure that the cover systems provide protection against direct exposure to the waste at the sites with native-soil covers or engineered covers. The performance standards identified for the containment alternative include:

- Installation of covers that are designed to remain in existence for the length of time an unacceptable risk is posed, in order to discourage any individual from inadvertently intruding into the buried waste or from contacting the waste.

- Application of maintenance and surface monitoring programs for the containment systems capable of providing early warning of releases of radionuclides and non-radionuclide contaminants of concern from the disposal sites before they leave the site boundary

- Institution of restrictions limiting land use for at least 100 years

- Implementation of surface water controls to direct surface water away from the disposed waste

- Elimination, to the extent practicable, of the need for ongoing active maintenance of the disposal sites following closure so that only surveillance, monitoring, or minor custodial care are required

- Placement of adequate cover to inhibit erosion by natural processes for the specified design lives of the covers

- Incorporation of features to inhibit biotic intrusion into the Warm Waste Pond 1952 and 1957 cells.

The inspection and maintenance of the cover system will be conducted concurrent with the radiological survey program. Implementation of the maintenance and survey programs will ensure protection of human health and the environment from any unacceptable risks. These programs will be implemented annually for the first 5 years following completion of the caps. The necessity for continued monitoring will then be reevaluated and defined as determined appropriate by the agencies during subsequent 5-year reviews.

8.2.2 Excavation and Disposal Performance Standards

Performance standards will be implemented to ensure that excavation and disposal activities will result in protection against direct exposure to the contaminants during excavation and after disposal. The performance standards identified for this alternative include:

- Physically removing the source of contamination so that the pathway by which a future receptor may be exposed is broken. This will be determined by confirmation soil sampling to ensure that the cleanup meets or exceeds preliminary remediation goals.

8.2.3 Limited Action Performance Standards

Performance standards will be implemented to ensure that institutional controls will result in protection against direct exposure to the contaminants for a period of at least 100 years (corresponding to the point in time at which the contaminants have decayed to below levels of concern). The performance standards identified for this alternative include:

- Installation, where necessary, and maintenance of physical barriers to restrict unauthorized access. This may include fences, ground surface cover, and/or posted warning signs.

- An evaluation of existing management and administrative controls to ensure that protection against direct exposure to contaminants is effective. This evaluation will be performed as part of the remedial design.

- Implementation of additional administrative controls as determined necessary by the evaluation described in bullet 2 of this subsection.

8.2.4 Treatment Performance Standards

Performance standards will be implemented to ensure that treatment of contaminated soil at the Chemical Waste Pond, if necessary, will achieve acceptable levels. The performance standards identified for treatment include:

- Treatment of contaminated soil to at least 0.2 mg/L TCLP for mercury.

8.3 Estimated Cost Details for the Selected Remedy

A summary of the costs for each of the remedial action alternatives evaluated is presented in Table 9-2. Tables 8-2 through 8-7 provide detailed breakdowns of the estimated costs for the selected remedies.

Table 8-2. Warm Waste Pond engineered barrier detailed cost estimate.

Cost Elements		Estimated Costs ($)
Management and Documentation Costs		
FFA/CO Management and Oversight		375,000
LMITCO Project Management and Title III Inspection		188,356
Construction Project Management (Parsons)		
Remedial Design/Remedial Action Statement of Work and Remedial		313,926
Design/Remedial Action Work Plan		22,000
	Subtotal	**899,282**
Remedial Design		
Title Design Construction Document Package		178,400
Remedial design documentation		60,000
Pre-final Inspection Report		8,000
	Subtotal	**246,400**
Construction Subcontract		
Mobilize/demobilize cap subcontractor		20,000
Construction of cap		688,939
Surface water control		16,000
Access restriction fencing		80,000
Contractor overhead and profit		241,482
Procurement and General and Administrative		376,711
	Subtotal	**1,423,132**
Post-closure Costs		
Post-closure management		3,125,000
Annual Operations and Management reports		250,000
WAG 5-year review		500,000
Remedial action report		17,000
Warm Waste Pond 100-year long-term total costs		2,120,000
	Subtotal	**5,512,000**
Total in 1997 dollars[a]		**8,580,814**
Total in net present value dollars		**6,843,216**

a. Costs shown are in 1997 dollars and net present value dollars. $8,580,814 in 1997 dollars is equal to $6,843,216 net present value dollars (net present value takes the 1997 dollar amount and assumes variable annual inflation factors for the first 10 years, and a constant 5% annual inflation rate after that for a total of 100 years. A constant 5% discount rate is then assumed, which results in the net present value amount).

Table 8-3. Chemical Waste Pond detailed cost estimate.

Cost Elements		Estimated Costs ($)
Management and Documentation Costs		
FFA/CO Management and Oversight		375,000
LMITCO Project Management and Title III Inspection		23,166
Construction Project Management (Parsons)		38,610
Remedial Design/Remedial Action Statement of Work and Remedial Design/Remedial Action Work Plan		22,000
	Subtotal	**458,776**
Remedial Design		
Title Design Construction Document Package		65,600
Remedial design documentation		60,000
Pre-final Inspection Report		8,000
	Subtotal	**133,600**
Construction Subcontract (Native Soil cover)		
Mobilize/demobilize cap subcontractor		10,000
Construction of cap		59,000
Surface water control		5,000
Access restriction fencing		25,000
Contractor overhead and profit		29,700
Procurement and General and Administrative		46,332
	Subtotal	**175,032**
Construction Subcontract (excavate, treat, dispose)		
Excavate and haul to on treatment		26,850
On treatment		859,200
Transport concentrated waste off		3,200
Transport clean soils back to Chemical Pond		4,136
Mobilize/demobilize		10,000
	Subtotal	**903,386**
Post-closure Costs (if contamination left in place)		
Post-closure management		3,125,000
Annual Operations and Management reports		250,000
WAG 5-year review		500,000
Remedial action report		17,000
Chemical Waste Pond long-term maintenance costs		822,000
	Subtotal	**4,714,000**
Total in 1997 dollars (Native Soil Cover only)		**5,481,408**
Total in net present value dollars		**3,904,959**

Table 8-4. Cold Waste Pond excavate and dispose detailed cost estimate.

Cost Elements		Estimated Costs ($)
Management and Documentation Costs		
FFA/CO Management and Oversight		375,000
LMITCO Project Management and Title III Inspection		28,548
Construction Project Management (Parsons)		47,580
Remedial Design/Remedial Action Statement of Work and Remedial Design/Remedial Action Work Plan		22,000
Packaging, Shipping, Transportation Plan		25,000
	Subtotal	**498,128**
Remedial Design		
Title Design Construction Document Package		44,600
Remedial design documentation		60,000
Pre-final Inspection Report		8,000
	Subtotal	**112,600**
Construction Subcontract		
Excavate and haul costs		112,000
Disposal costs		896,000
Mobilize/demobilize cap subcontractor		10,000
Contractor overhead and profit		36,600
Procurement and General and Administrative		57,096
	Subtotal	**1,111,696**
Post-closure Costs		
Remedial action report		17,000
	Subtotal	**17,000**
Total in 1997 dollars		**1,739,424**
Total in net present value dollars		**1,592,818**

Table 8-5. Sewage Leach Pond native soil cover detailed cost estimate.

Cost Elements		Estimated Costs ($)
Management and Documentation Costs		
FFA/CO Management and Oversight		375,000
LMITCO Project Management and Title III Inspection		28,080
Construction Project Management (Parsons)		46,800
Remedial Design/Remedial Action Statement of Work and Remedial Design/Remedial Action Work Plan		22,000
	Subtotal	**471,880**
Remedial Design		
Title Design Construction Document Package		65,600
Remedial design documentation		60,000
Pre-final Inspection Report		8,000
	Subtotal	**133,600**
Construction Subcontract		
Mobilize/demobilize cap subcontractor		20,000
Construction of cap		70,000
Surface water control		5,000
Access restriction fencing		25,000
Contractor overhead and profit		36,000
Procurement and G&A		56,160
	Subtotal	**212,160**
Post-closure Costs		
Post-closure management		3,125,000
Annual Operations and Management reports		250,000
WAG 5-year review		500,000
Remedial action report		17,000
Sewage Leach Pond long-term maintenance costs		934,000
	Subtotal	**4,826,000**
Total in 1997 dollars		**5,643,640**
Total in net present value dollars		**4,028,832**

Table 8-6. TRA-15, TRA-19, Brass Cap Area limited action detailed cost estimate.

Cost Elements		Estimated Costs ($)
Management and Documentation Costs		
FFA/CO Management and Oversight		125,000
LMITCO Project Management and Title III Inspection		983
Construction Project Management (Parsons)		1,638
Remedial Design/Remedial Action Statement of Work and Remedial Design/Remedial Action Work Plan		22,000
	Subtotal	**149,621**
Remedial Design		
Title Design Construction Document Package		18,800
Remedial design documentation		60,000
Pre-final Inspection Report		8,000
	Subtotal	**86,800**
Inspection and Maintenance Costs		
Access restriction fencing		35,000
Surface water diversion		700
Subcontractor overhead and profit		1,260
Procurement and General and Administrative fees		1,966
	Subtotal	**7,426**
Post-closure Costs		
Post-closure management		3,093,750
Annual Operations and Management reports		247,500
Remedial Action Report		17,000
WAG 5-year review		500,000
Long-term maintenance costs		570,000
	Subtotal	**4,428,250**
Total in 1997 dollars		**4,672,099**
Total in net present value dollars		**2,312,337**

Table 8-7. Sewage Leach Pond Berm and Soil Contamination Area limited action detailed cost estimate.

Cost Elements		Estimated Costs ($)
Management and Documentation Costs		
FFA/CO Management and Oversight		125,000
LMITCO Project Management and Title III Inspection		28,080
Construction Project Management (Parsons)		46,800
Remedial Design/Remedial Action Statement of Work and Remedial Design/Remedial Action Work Plan		22,000
	Subtotal	**221,880**
Remedial Design		
Title Design Construction Document Package		18,800
Remedial Design Documentation		60,000
Pre-final Inspection Report		8,000
	Subtotal	**86,800**
Inspection and Maintenance Costs		
Access restriction fencing		100,000
Surface water diversion		20,000
Subcontractor overhead and profit		36,000
Procurement and General and Administrative fees		56,160
	Subtotal	**212,160**
Post-closure Costs		
Post-closure management		3,093,750
Annual Operations and Management reports		247,500
Remedial action report		17,000
WAG 5-year review		500,000
Long-term maintenance costs		570,000
	Subtotal	**4,428,250**
Total in 1997 dollars		**4,949,090**
Total in net present value dollars		**3,497,155**

Table 8-8. Brass Cap Area excavation and disposal contingent remedy detailed cost estimate.

Cost Elements		Estimated Costs ($)
Management and Documentation Costs		
FFA/CO Management and Oversight		375,000
LMITCO Project Management and Title III Inspection		6,578
Construction Project Management (Parsons)		10,963
Remedial Design/Remedial Action Statement of Work and Remedial Design/Remedial Action Work Plan		47,000
	Subtotal	**439,541**
Remedial Design		
Title Design Construction Document Package		44,600
Remedial Design Documentation		60,000
Pre-final Inspection Report		8,000
	Subtotal	**112,600**
Construction Subcontract		
Excavate and haul		5,250
Transport and disposal costs		42,000
Refill borrowed and reseeding		5,420
Mobilize/demobilize		10,000
Contractor overhead and profit		6,201
Procurement and General and Administrative		9,674
	Subtotal	**78,545**
Post-closure Costs		
Remedial action report		17,000
	Subtotal	**17,000**
Total in 1997 dollars		**647,686**
Total in net present value dollars		**598,512**

Table 8-9. TRA-19 excavation and disposal contingent remedy detailed cost estimate.

Cost Elements		Estimated Costs ($)
Management and Documentation Costs		
FFA/CO Management and Oversight		375,000
LMITCO Project Management and Title III Inspection		3,801
Construction Project Management (Parsons)		6,334
Remedial Design/Remedial Action Statement of Work and Remedial Design/Remedial Action Work Plan		47,000
	Subtotal	**439,541**
Remedial Design		
Title Design Construction Document Package		44,600
Remedial Design Documentation		60,000
Pre-final Inspection Report		8,000
	Subtotal	**112,600**
Construction Subcontract		
Excavate and haul		1,150
Transport and disposal costs		9,200
Refill borrowed and reseeding		5,092
Mobilize/demobilize		10,000
Contractor overhead and profit		4,873
Procurement and General and Administrative		2,601
	Subtotal	**37,916**
Post-closure Costs		
Remedial action report		17,000
	Subtotal	**17,000**
Total in 1997 dollars		**599,651**
Total in net present value dollars		**549,110**

9. STATUTORY DETERMINATION

The selected remedy for each site meets the statutory requirements of CERCLA Section 121, the regulations contained in the NCP, and the requirements of the FFA/CO for the INEEL. All remedies meet the threshold criteria established in the NCP (i.e., protection of human health and the environment and compliance with ARARs). CERCLA also requires that the remedy use permanent solutions and alternative treatment technologies to the maximum extent practicable, and that the implemented action be cost effective. Finally, the statute includes a preference for remedies that employ treatment that permanently and significantly reduce the volume, toxicity, or mobility of hazardous wastes as their principal element. For many of the sites contaminated with radionuclides, effective treatment technologies are currently unavailable; therefore, the preference for permanent solutions cannot be met except through natural radioactive decay processes over time. For those sites where contaminated soils and sediments will be left in place at levels associated with a risk greater than 1E-04 and a hazard index greater than 1.0, a review will be conducted within 5 years and at least every 5 years thereafter, until determined by the agencies to be no longer necessary to ensure that the remedy continues to provide adequate protection of human health and the environment.

9.1 Protection of Human Health and the Environment

As described in Section 8, the selected remedy for each site satisfies the criterion of overall protection of human health and the environment.

9.1.1 Alternative 1: No Action

No remedial action is necessary to ensure continued protection of human health and the environment at the 47 sites identified in Section 8.9. Because no unacceptable risks to human health and the environment were identified, or those risks were mitigated during previous cleanups, the No Action alternative has been selectedand environmental monitoring is not warranted.

9.1.2 Alternative 2: Limited Action

Protection of human health is achieved by this alternative through existing administrative and institutional controls that reduce the potential for exposure to site contaminants. The use of routine maintenance, access restriction, long-term environmental monitoring, and surface water diversion are included in this remedy. Protection of environmental receptors is not ensured under this alternative. However, for TRA-15 19, Brass Cap Area, and Sewage Leach Pond Soil Contamination Area, for which this remedy was selected, no unacceptable risks to environmental receptors have been identified.

9.1.3 Alternatives 3a and 3b: Containment with Engineered Cover or Native Soil Cover

The containment cover alternatives prevent direct contact with contaminants by all potential receptors, reduce radiation external exposure through shielding, and reduce the likelihood of biointrusion (engineered cover only).

9.1.4 Alternative 4: Excavation, Treatment, and Disposal

This alternative provides maximum protection of human health and the environment by the reduction of toxicity, mobility, and volume of mercury-contaminated sediments through excavation and treatment. Following treatment, contaminated sediments would be disposed and would, therefore, no longer pose a risk to human and environmental receptors at OU 2-13.

9.1.5 Alternative 5: Excavation and Disposal

The excavation and disposal alternative provides the best protection of human health and the environment by removing contaminants that pose an unacceptable risk and placing them in a licensed disposal facility designed to protect human health and the environment.

9.2 Compliance with ARARs

In general, sites identified during the OU 2-13 RI/FS as needing remedial action are the result of releases to the environment that had little known potential to contain RCRA hazardous waste or PCBs. The exception is the Chemical Waste Pond, which was known to have received corrosive hazardous waste, and, more recently, wastewaters containing levels of mercury above the TCLP level. Recent evaluations have determined that small quantities of RCRA-listed solvents and PCBs may also be associated with some sites. RCRA-listed solvents may have been disposed to the warm wastewater and hot wastewater systems at TRA, resulting from the use of small quantities of solvents in TRA laboratories, which may have released small quantities of the solvent to drains that are connected to these systems. Trichloroethylene (TCE), a RCRA-listed solvent, and PCBs are associated with soil from TAN, which was placed in the 57 cell of the Warm Waste Pond during an OU 10-06 removal action.

Of the eight sites needing remedial action under this ROD, four are associated with the warm wastewater system, hot wastewater system, and/or OU 10-06 removal actions. The sites include the hot waste tanks (TRA-15), the hot waste catch tanks (TRA-19), the Brass Cap Area, and the Warm Waste Pond. Therefore, soils at these sites associated with releases from the warm waste system, hot waste system, and/or 10-06 removal actions will be managed in a manner consistent with the hazardous waste determination to be performed at the time of the remedial action. Any final determination to be made in regard to management of the Warm Waste Pond soils will be pursued within time frames capable of supporting the schedule to be established in the RD/RA SOW.

Soil from the Test Area North placed in the Warm Waste Pond during the OU 10-06 removal action may have been contaminated with very low levels of PCBs. This soil was analyzed for PCBs; however, none were detected. The maximum detection limit of the data set was 0.220 ppm. The agencies have determined that these soils need not be managed as PCB-contaminated soil since the residual PCB levels are below the office of solid waste and emergency response directive guidance level of 25 ppm at Superfund Sites. The data supporting this decision can be found in the OU 2-13 Administrative Record as attachments to agency comment responses to the OU 2-13 Draft ROD.

The selected remedies will be designed to comply with all chemical-specific, action-specific, and location-specific federal and state ARARs, as described in Section 7.3 and presented in Table 9-1.

Table 9-1. Summary of ARARs met by selected alternatives for OU 2-13 sites of concern.

(1) Warm Waste Pond—Containment with an engineered barrier		
Chemical-Specific ARARs		
40 CFR 61.92	NESHAPS for Radionuclides from DOE Facilities	Applicable
40 CFR 61.93	Emission Monitoring	Applicable
40 CFR 61.94(a)	Emission Compliance	Applicable
IDAPA 16.01.01., .585 and .586	Toxic Substances	Applicable
Action-Specific ARARs		
It is anticipated that the requirements of 40 CFR 264.310 (a) (1) and (5) could be met for the 1964 cell demonstrating that contaminant migration to the aquifer does not pose an unacceptable risk.		
40 CFR 264.309(a) and (b)	Surveying and Recordkeeping	R & A
40 CFR 264.310(a)(1)(2) (3) (4)(5)	Closure and post-closure care	R & A
40 CFR 264.310(b) (1) (5) (6)	Closure and post-closure care	R & A
Location-Specific ARARs		
(2a) Chemical Waste Pond—Containment with native soil barrier		
Chemical-Specific ARARs		
40 CFR 61.92	NESHAPS for Radionuclides from DOE Facilities	Applicable
40 CFR 61.93	Emission Monitoring	Applicable
40 CFR 61.94(a)	Emission Compliance	Applicable
IDAPA 16.01.01., .585, and . 586	Toxic Substances	Applicable

Table 9-1. (continued).

Action-Specific ARARs		
It is anticipated that the requirements of 40 CFR 264.310 (a)(1) and 5 could be met for the Chemical Waste Pond by demonstrating that contaminant migration to the aquifer does not pose an unacceptable risk.		
40 CFR 264.309(a) and (b)	Surveying and Recordkeeping	R & A
40 CFR 264.310(a)(1)(2)(3)(4)(5)	Closure and Post Closure	R & A
40 CFR 264.310(b)(1)(5)(6)	Closure and Post Closure	R & A
2(b) Chemical Waste Pond—excavation and off-site disposal		
Chemical-Specific ARARs		
40 CFR 61.92	NESHAPS Radionuclide Emissions from DOE Facilities	Applicable
40 CFR 61.93	Emission Monitoring	Applicable
40 CFR 61.94(a)	Emission Compliance	Applicable
IDAPA 16.01.01.585 - .586	Toxic Substances	Applicable
Action-Specific ARARs		
40 CFR 262.11	Hazardous Waste Determination	Applicable
(Note: Waste excavated from the Chemical Waste Pond will be managed in accordance with the outcome of the hazardous waste determination)		
(3) Cold Waste Pond—Excavate and dispose onsite		
Chemical-Specific ARARs		
40 CFR 61.92	NESHAPS for Radionuclides from DOE Facilities	Applicable
40 CFR 61.93	Emission Monitoring	Applicable
40 CFR 61.94(a)	Emission Compliance	Applicable
IDAPA 16.01.01., .585, and .586	Toxic Substances	Applicable

Table 9-1. (continued).

Action-Specific ARARs		
40 CFR 262.11	Hazardous Waste Determination	Applicable
Note: Waste excavated from the Cold Waste Pond will be managed in accordance with the outcome of the hazardous waste determination.		
(4) Soil Surrounding Tanks 1 and 2 at Building 630 (TRA-19)—Institutional control with excavate and disposal contingency		
Chemical-Specific ARARS		
40 CFR 61.92	NESHAPS for Radionuclides from DOE Facilities	Applicable
40 CFR 61.93	Emission Monitoring	Applicable
40 CFR 61.94(a)	Emission Compliance	Applicable
IDAPA 16.01.01., .585, and .586	Toxic Substances	Applicable
Action-Specific ARARs		
40 CFR 262.11	Hazardous Waste Determination	Applicable
Note: Waste excavated from TRA-19 will be managed in accordance with the outcome of the hazardous waste determination.		
(5) Brass Cap Area—Institutional control with excavate and disposal contingency		
Chemical-Specific ARARs		
40 CFR 61.92	NESHAPS for Radionuclides from DOE Facilities	Applicable
40 CFR 61.93	Emission Monitoring	Applicable
40 CFR 61.94(a)	Emission Compliance	Applicable
IDAPA 16.01.01., .585, and .586	Toxic Substances	Applicable
Action-Specific ARARs		
40 CFR 262.11	Hazardous Waste Determination	Applicable

Table 9-1. (continued).

Action-Specific ARARs		
40 CFR 262.11	Hazardous Waste Determination	Applicable
(Note: Waste excavated from the Brass Cap Area will be managed in accordance with the hazardous waste determination)		
(6) Soil Surrounding Hot Waste Tanks at Building 613 (TRA-15)—Institutional Control		
Action-Specific ARARs		
40 CFR 61.92	NESHAPS for Radionuclides from DOE Facilities	Applicable
40 CFR 61.93	Emission Monitoring	Applicable
40 CFR 61.94(a)	Emission Compliance	Applicable
IDAPA 16.01.01., .585, and .586	Toxic Substances	Applicable
(7) Sewage Leach Pond Berm and Soil Contamination Area (SLP-SCA)—Institutional Control/use as backfill in the Sewage Leach Pond		
Chemical-Specific ARARs		
40 CFR 61.92	NESHAPS for Radionuclides from DOE Facilities	Applicable
40 CFR 61.93	Emission Monitoring	Applicable
40 CFR 61.94(a)	Emission Compliance	Applicable
IDAPA 16.01.01., .585, and .586	Toxic Substances	Applicable
Action-Specific ARARs		
(8) Sewage Leach Pond—Native Soil Cover		
Chemical-Specific ARARs		
40 CFR 61.92	NESHAPS for Radionuclides from DOE Facilities	Applicable
40 CFR 61.93	Emission Monitoring	Applicable
40 CFR 61.94(a)	Emission Compliance	Applicable
IDAPA 16.01.01., .585 and .586	Toxic Substances	Applicable

Table 9-1. (continued).

(9) Additional ARARs for all Actions at all Sites		
Action-Specific ARARs		
40 CFR 262.11	Hazardous Waste Determination	Applicable
IDAPA 16.01.05.005-.011	Idaho Hazardous Waste Regulations, which reference Federal regulations.	Applicable
40 CFR 268.7, .9, .40, .45, and .48	Land Disposal Restrictions	Applicable
40 CFR 122.26	Stormwater Discharge Requirements	Applicable
IDAPA 16.01.01.651	Rules for Control of Fugitive Dust	Applicable
Chemical Specific ARARs		
IDAPA 16.01.01.500.02	Operation of and Air Emissions from Portable Equipment	Applicable
IDAPA 16.01.02.299(5)(a)(b)	Idaho Groundwater Quality Standards	Applicable
IDAPA 16.01.11.200	Idaho Groundwater Quality Rule	R&A
(10) To Be Considered		
DOE Order 5400.3	Hazardous and Mixed Waste Program	
DOE Order 5820.2A, Chapter III	Low-Level Radioactive Waste Management	
DOE Order 5400.5	Radiation Protection Std.	

Chemical-specific ARARs are usually health- or risk-based numerical substantive requirements of the values or methodologies that, when applied to site-specific conditions, result in the establishment of numerical values. These values establish the acceptable amounts or concentrations of a chemical that may be found in, or discharged to, the ambient environment.

Action-specific ARARs are usually technology- or activity-based requirements for actions taken at a site. Action-specific ARARs generally do not guide the development of remedial action alternatives, but they indicate how the selected remedy must be implemented.

A number of statutes have requirements related to activities occurring in particular locations. For instance, waste management activities in flood plains are restricted under RCRA. Location-specific ARARs are regulatory requirements placed on activities in specific locations that must be met by a given remedial action. These location-specific ARARs are used in conjunction with chemical and action-specific ARARs to ensure that remedial actions are protective of human health and the environment.

The following information provides a general discussion describing why a requirement is either applicable or relevant and appropriate at each of the sites of concern.

Warm Waste Pond—National Emissions Standards for Hazardous Air Pollutants (NESHAPS) for radionuclide emissions from DOE facilities is applicable to this activity because radionuclides may be suspended during soil movement and consolidation. The radiation dose to the public will be estimated and included in the annual INEEL calculations and reports. If radionuclides associated with fugitive dust releases exceed acceptable standards (10 mrem/yr to the public), then the need for additional measures will be evaluated and implemented as appropriate.

The requirements of 40 CFR 264.309 and 264.310, included in Table 9-1, are relevant and appropriate because of recent information that shows RCRA-listed constituents were likely disposed to the Warm Waste Pond. The requirements of 40 CFR 264.310 (a) (1) and (5) may be met by demonstrating that no unacceptable risk is present via the groundwater pathway. It is anticipated that such a determination could be made for the 1964 cell, but is not anticipated for the 1952 or 1957 cells.

Idaho rules for toxic air emissions are applicable because they also address releases or emissions of radionuclides to the atmosphere, such as may occur during soil movement and consolidation.

Chemical Waste Pond—NESHAPS for radionuclide emissions from DOE facilities is applicable to this activity because radionuclides may be suspended during soil movement and consolidation. The radiation dose to the public will be estimated and included in the annual INEEL calculations and reports. If radionuclides associated with fugitive dust releases exceed acceptable standards (10 mrem/yr to the public), then the need for additional measures will be evaluated and implemented as appropriate.

Idaho rules for toxic air emissions are applicable because they address mercury and radionuclides emissions to the atmosphere, such as may occur during soil movement and consolidation.

The Chemical Waste Pond is a land disposal unit. The agencies deem this risk-based CERCLA remedial action to be functionally equivalent to RCRA corrective action requirements to eliminate unacceptable risk. Administrative RCRA closure requirements will occur separately from the ROD after the remedial action is completed. However, the requirements of 40 CFR 264.309 and 264.310, as listed in Table 9-1, would be appropriate performance standards and, therefore, can be considered relevant and appropriate for this action. If excavation and disposal were to occur, waste would be managed in accordance with the outcome of a hazardous waste determination conducted at the time of the remedial action (e.g., treatment of contaminated soil to at least 0.2 mg/L TCLP for mercury).

Cold Waste Pond—NESHAPS for radionuclide emissions from DOE facilities are applicable to this activity because radionuclides may be suspended during soil movement and consolidation. The radiation dose to the public will be estimated and included in the annual INEEL calculations and reports. If radionuclides associated with fugitive dust releases exceed acceptable standards (10 mrem/yr to the public), then the need for additional measures will be evaluated and implemented as appropriate.

Requirements for hazardous waste determinations and for management of hazardous waste are applicable during excavation and disposal. While unlikely, sediments may exhibit a characteristic of a hazardous waste. If so, sediments must be managed and disposed as hazardous waste.

Idaho rules for toxic air emissions are applicable because they address radionuclide emissions to the atmosphere, such as may occur during soil movement and consolidation.

Soil Surrounding Tanks 1 and 2 at Building 639 (TRA-19)—NESHAPS for radionuclide emissions from DOE facilities are applicable to this activity because radionuclides may be suspended during soil movement and consolidation. The radiation dose to the public will be estimated and included in the annual INEEL calculations and reports. If radionuclides associated with fugitive dust releases exceed acceptable standards (10 mrem/yr to the public), then the need for additional measures will be evaluated and implemented as appropriate.

Requirements for hazardous waste determinations and for management of hazardous waste are applicable during excavation and disposal. When contaminated soil is eventually excavated, then requirements for hazardous waste management and disposal are applicable, because the soil may contain RCRA-listed hazardous waste from warm and/or hot waste system leaks. If so, sediments must be managed and disposed as hazardous waste.

Idaho rules for toxic air emissions are applicable because they address radionuclide emissions to the atmosphere, such as may occur during soil movement and consolidation.

Brass Cap Area—NESHAPS for radionuclide emissions from DOE facilities are applicable to this activity because radionuclides may be suspended during soil movement and consolidation. The radiation dose to the public will be estimated and included in the annual INEEL calculations and reports. If radionuclides associated with fugitive dust releases exceed acceptable standards (10 mrem/yr to the public) then the need for additional measures will be evaluated and implemented as appropriate.

Requirements for hazardous waste determinations and for management of hazardous waste are applicable during excavation and disposal. When contaminated soil is eventually excavated, then requirements for hazardous waste management and disposal are applicable, because the soil may contain RCRA-listed hazardous waste from warm and/or hot waste system leaks. If so, sediments must be managed and disposed as hazardous waste.

Idaho rules for toxic air emissions are applicable because they address radionuclide emissions to the atmosphere, such as may occur during soil movement and consolidation.

Soil Surrounding Hot Waste Tanks at Building 613 (TRA-15)—NESHAPS for radionuclide emissions from DOE facilities are applicable to this activity because radionuclides may be suspended. The radiation dose to the public will be estimated and included in the annual INEEL calculations and reports. If radionuclides associated with fugitive dust releases exceed acceptable standards (10 mrem/yr to the public), then the need for additional measures will be evaluated and implemented as appropriate.

Idaho rules for toxic air emissions are applicable because they address radionuclide emissions to the atmosphere, such as may occur during soil movement and consolidation.

Sewage Leach Pond Berm and Soil Contamination Area (SLP-SCA)—NESHAPS for radionuclide emissions from DOE facilities are applicable to this activity because radionuclides may be suspended during soil movement and consolidation. The radiation dose to the public will be estimated and included in the annual INEEL calculations and reports. If radionuclides associated with fugitive dust releases exceed acceptable standards (10 mrem/yr to the public), then the need for additional measures will be evaluated and implemented as appropriate.

Idaho rules for toxic air emissions are applicable because they address radionuclide emissions to the atmosphere, such as may occur during soil movement and consolidation.

9.2.1 Additional ARARs

A hazardous waste determination is required for all waste generated during remedial activities. All selected remedies at WAG 2 that result in generation of hazardous waste will be required to adhere to pertinent substantive RCRA requirements (e.g., LDR standards) during excavation, storage, transportation, treatment and disposal activities.

All selected remedies at WAG-2 that result in hazardous waste storage or soil movement or excavation will be required to apply requirements to prevent contamination of storm water runoff into waters of the United States.

Remedial actions taken at WAG 2 must protect groundwater and demonstrate that water quality specifications found in the Idaho Water Quality standards and under the Idaho Groundwater Quality Rule will be met or achieved.

Any remedial activities that may result in generation of fugitive dust are subject to Idaho requirements for preventing escape, suspension, or release of fugitive dust.

Remedial activities at WAG-2 may require various types of portable equipment. Portable equipment and air emissions from portable equipment must meet requirements specified in Idaho Air Quality regulations.

9.2.2 To Be Considered

DOE orders will be evaluated as To-Be-Considered, especially in the absence of applicable state or federal regulation. DOE Order 5400.3 requirements address programs for managing hazardous and mixed waste.

DOE Order 5400.5 provides guidance on radiological environmental protection requirements and guidelines for cleanup of residual radioactive material and management of the resulting waste and residue and release of property. This order shall be used in lieu of applicable state or federal groundwater standards for radionuclides.

DOE Order 5820.2A provides guidance on disposal of low-level radioactive waste at DOE facilities.

9.3 Cost Effectiveness

Table 9-2 summarizes the estimated costs in net present value for the five alternatives at each site of concern. These costs were estimated assuming annual inflation rate for the first 10 years and a constant 5% annual inflation rate after that. A constant 5% discount rate is assumed. Each remedial action selected is cost effective because it provides overall effectiveness in meeting the remedial action objectives proportionate to its costs. When compared to other potential remedial actions, the selected remedies provide the best balance between cost and effectiveness in protecting human health and the environment. Please note that the WAG 2 comprehensive feasibility study eliminated the Limited Action alternative on the basis of effectiveness for all sites, except the Sewage Leach Pond Berms and Soil Contamination Area and Soil Surrounding Hot Waste Tanks at Building 613 (TRA-15). Therefore, Limited Action costs are presented only for these two sites in Table 9-2.

At the Warm Waste Pond, initial construction costs are higher than for the native soil cover. However, the Engineered Cover provides greater protection for a longer period of time with less maintenance required, thereby making this alternative more cost effective in the long run. The costs of monitoring, access restrictions, and surface water diversion are nearly the same for the engineered barrier and the native soil cover. Long-term air monitoring requirements are relatively low, assuming the air monitoring would be performed as part of INEEL-wide programs.

At the Sewage Leach Pond, where a Native Soil Cover will be employed, the cost is based on constructing the native soil cover, installing surface-water diversion controls, using monitoring equipment, conducting analyses, and post-closure monitoring and maintenance for at least 100 years. It is expected that a higher level of maintenance will be required for the native soil covers when compared to the engineered barrier.

At the Chemical Waste Pond, if a Native Soil Cover will be constructed, the cost is based on constructing the native soil cover, installing surface-water diversion controls, using monitoring equipment, conducting analyses, and post-closure monitoring and maintenance for at least 100 years. If excavation, treatment, and disposal are selected as part of this alternative, the cost is based on the excavation of mercury-contaminated soils below 260 ppm, treatment using a solidification process such as grouting or chemical stabilization, and disposal offsite at an approved hazardous waste landfill.

For the Excavation and Disposal alternative at the Cold Waste Pond, initial implementation costs are higher than the other alternatives considered. However, by removal of contaminants, the requirement for long-term maintenance and monitoring is eliminated, making this alternative cost effective proportional to its effectiveness in protecting human health and the environment.

For the Sewage Leach Pond Soil Contamination Area, TRA-15, TRA-19, and the Brass Cap Area, the overall cost of the Limited Action remedy compared to effectiveness is low. The cost compared to

Table 9-2. Summary of alternative cost estimates for the eight sites of concern.

Site	Alternative 1 No Action ($)	Alternative 2 Limited Action ($)	Alternative 3a Containment w/Engineered Cover ($)	Alternative 3b Containment w/Native Soil Cover ($)	Alternative 4 Excavation, Retort Disposal ($)	Alternative 4a Excavation, Solidification, Disposal	Alternative 5 Excavation and Disposal ($)
Warm Waste Pond (TRA-03)	3,247,554	N/A	6,843,216	9,890,638	N/A	N/A	30,546,453
Chemical Waste Pond (TRA-06)	2,954,543	N/A	4,352,457	3,904,959	5,768,466	953, 676	828,163
Cold Waste Pond (TRA-08)	2,995,006	N/A	5,800,712	4,411,567	N/A	N/A	1,592,818
Sewage Leach Pond (TRA-13)	2,954,543	N/A	4,475,562	4,028,832	N/A	N/A	5,320,029
Soil surrounding hot waste tanks at Building 613 (TRA-15)	2,201,897	2,312,337	2,703,481	N/A	N/A	N/A	2,991,849
Soil surrounding Tanks 1 and 2 at Building 630 (TRA-19)	2,201,897	N/A	6,495,451	N/A	N/A	N/A	549,110
Brass Cap Area	2,201,897	N/A	2,700,998	N/A	N/A	N/A	548,512
Sewage Leach Pond berms and soil contamination area.	2,954,543	3,497,155	N/A	N/A	N/A	N/A	3,457,090

N/A = cost considered insignificant or not applicable.

a. All costs in Net Present Value and include contingency. Costs are based on cost estimate entitled "Cost Estimates for OU 2-13 Remedial Alternatives" found in Appendix L of the OU 2-13 Comprehensive RI/FS Report. Net present value costs were estimated assuming variable annual inflation factors for the first 10 years, and a constant 5% annual inflation rate after that. A constant 5% discount rate is assumed.

Shaded boxes indicate costs for the selected remedy for each site.

effectiveness is further decreased for the TRA-19 and Brass Cap Area where eventual excavation and disposal costs will be incurred. However, institutional and administrative costs associated with the Limited Action alternative were based on the assumption that none of these measures are currently in place. On the contrary, administrative and institutional controls are currently in place because TRA facility operations are on-going. The added cost of invoking the Limited Action alternative recommended in this ROD is expected to be minimal. However, a post-ROD evaluation will be conducted to determine what additional administrative and institutional controls will be required as a result of this ROD.

9.4 Preference for Treatment as a Principal Element

For radionuclide-contaminated sites, effective treatment technologies that would satisfy this criterion do not currently exist. However, natural radioactive decay will result in the reduction of contaminant concentrations to acceptable levels within approximately 300 years. The EPA's preference for sites that pose relatively low long-term threats, or where treatment is impracticable (e.g., TRA radionuclide contamination) is engineering controls, such as containment.

In the case of mercury contamination at the Chemical Waste Pond, the preference for treatment as a principal element of the remedy will not be fulfilled if the selected remedy is only containment with a native soil cover. However, containment with a native soil cover is appropriately protective of human health and the environment. If excavation, treatment, and disposal are chosen as part of the selected remedy, then the preference for treatment as a principal element of the remedy will be fulfilled. The specific design of the remedy selected, native soil cover with possible excavation, treatment, and disposal after sampling, will depend upon the results of a sampling effort as a first step after the ROD and before the final design is completed.

10. DOCUMENTATION OF SIGNIFICANT CHANGES

CERCLA Section 117(b) requires that an explanation of any significant changes from the preferred alternative originally presented in the Proposed Plan be provided in the ROD.

Refinements have been made to the selected remedy for the Chemical Waste Pond. The Proposed Plan recommended containment with native soil cover after excavation, treatment, and disposal of contaminated sediments. A number of possible options for the excavation and disposal part of the remedy discussed in the Proposed Plan were dependent on the levels of mercury found in the pond sediments.

The approach presented in the Proposed Plan can be simplified because the native soil cover alternative will meet cleanup objectives for the Chemical Waste Pond whether or not sediments are excavated and disposed prior to filling the pond to grade. However, it is not clear whether the native soil cover alternative is more cost effective with or without some excavation and disposal of contaminated sediments. Cost effectiveness is dependent on the amount of soil that would need to be excavated, the requirements for its management during and after excavation through disposal (e.g., RCRA requirements for treatment and disposal), and on the rigor of the cover design and the need for long-term monitoring and maintenance. If the amount of contaminated soil that would need to be excavated and the requirements for its management are relatively minor, then excavation and disposal followed by filling the pond to grade with clean backfill materials would likely be the most cost effective. This is because, with the majority of contamination removed, the pond could be filled to grade with minimal backfill specifications, and long-term monitoring and maintenance would not be needed. If larger amounts of soils needed to be excavated and disposed and the levels of mercury in the soil required treatment prior to disposal, then it would likely be more cost effective to design a cover with more strict specifications and to implement long-term monitoring and maintenance of that cover. In order to make a final determination on the design of the native soil cover, further sampling and analysis need to be completed in the pond to define the amount of soil that would require excavation and how the soil would have to be managed and the associated cost.

Therefore, the specific design of the remedy selected in this ROD, native soil cover with possible excavation and disposal after sampling, will be dependent upon the results of a sampling and analysis effort as a first step after the ROD, but before the final design is completed. Figure 10-1 presents a flow chart of this logic.

Recent investigations have determined that RCRA-listed waste may have been present in the TRA warm and hot waste systems when leaks from the systems to the environment occurred. If soil is excavated for disposal, a hazardous waste determination will be required. Therefore, soils at those sites associated with releases from the warm waste system and hot waste system will be managed in a manner consistent with the hazardous waste determination to be performed at the time of the remedial action.

The primary elements of the preferred alternatives for the sites of concern at the TRA remained relatively unchanged. For this reason, the agencies determined that a new proposed plan and public comment period were unnecessary.

The Proposed Plan made the following statement in regards to no action sites: "The No Action status of these sites will be verified on an annual basis to determine whether the status has changed. The concern

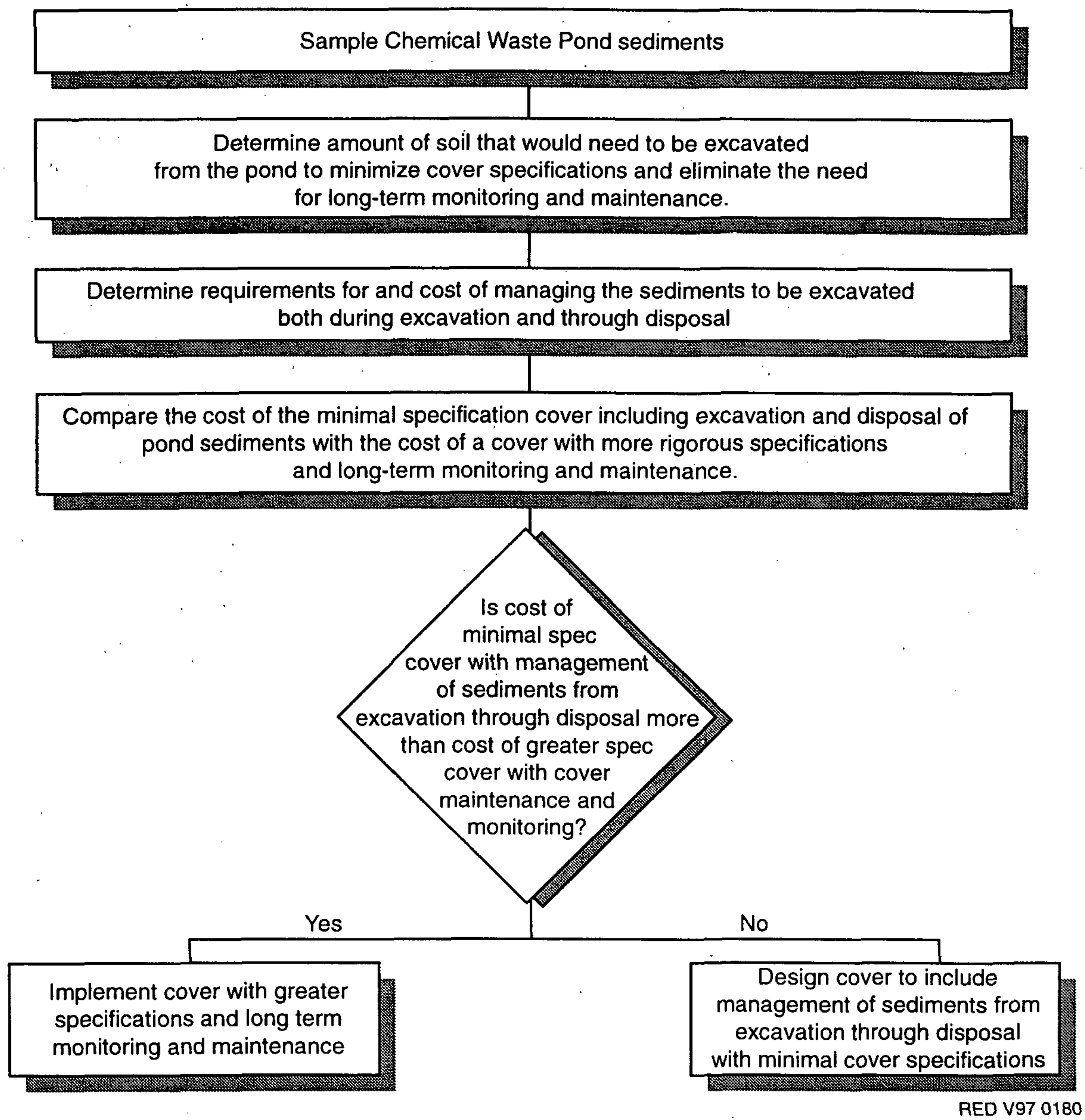


Figure 10-1. Chemical Waste Pond logic diagram.

is that the continued operation of the Test Reactor Area may adversely impact these sites, and therefore, such status verification is necessary." This language has been changed in the ROD to be consistent with the NCP. The following language is incorporated in this ROD: "For those sites for which no action is being taken based on land use assumptions, those assumptions will be reviewed as part of the 5-year review."

In addition, the following statement regarding future discoveries of contamination was made in the Proposed Plan: "The possibility exists that contaminated environmental media not identified by the INEL Federal Facility Agreement and Consent Order (FFA/CO) or in this comprehensive investigation will be discovered in the future as a result of routine operations, maintenance activities, and/or decontamination and dismantlement activities at the Test Reactor Area. Future discoveries of radioactively and chemically contaminated environmental media will be evaluated as part of the CERCLA 5-year review process. The 5-year review process will ensure remedial actions and institutional controls are maintained. Five-year reviews will also ensure that any changes in the physical configuration of any Test Reactor facility or site where there is a suspicion of a release of hazardous substances (such as decontamination and dismantlement or facility renovation/modification) will be managed to achieve remediation goals consistent with remedies established for the sites in this proposed plan. Sufficient planning documentation for such actions will be submitted to the agencies before implementation to ensure this consistency."

This language has been changed in the ROD to be consistent with the NCP as follows: "The possibility exists that contaminated environmental media not identified by the INEEL FFA/CO or in this comprehensive investigation will be discovered in the future as a result of routine operations, maintenance activities, and decontamination and dismantlement activities at TRA." "Upon discovery of a new contaminant source by DOE, IDHW, or EPA, that contaminant source will be evaluated and appropriate response action taken in accordance with the FFA/CO."

The Proposed Plan described Alternative 1 as No Action (with monitoring) based on the presumption that contamination would be left in place under this alternative. However, any contamination remaining in place has been determined to not pose an unacceptable risk. Therefore, long-term environmental monitoring is not warranted for the 47 no action sites.

11. RESPONSIVENESS SUMMARY

The Responsiveness Summary is designed to provide the agencies with information about community preferences regarding the selected remedial alternatives and general concerns about the site. Secondly, it summarizes how public comments were evaluated and integrated into the decision-making process and records how the agencies responded to each of the comments. Appendix A provides a summary of community involvement in the CERCLA process for OU 2-13 and a summary of comments received and corresponding agency responses.

Appendix A

Responsiveness Summary

Appendix A

Responsiveness Summary

A Summary of Comments Received During the Public Comment Period

A-1. OVERVIEW

Operable Unit (OU) 2-13 is within Waste Area Group (WAG) 2 of the Test Reactor Area (TRA) at the Idaho National Engineering and Environmental Laboratory (INEEL). The unit contains 55 identified release sites contained within 13 operable units. Eight of these sites were determined during the comprehensive remedial investigation/feasibility study (RI/FS) to have contamination that poses a potential risk to human health and the environment and that requires remedial action to reduce or eliminate those risks. For the eight sites that include four disposal ponds, three subsurface soil contamination areas, and one area of windblown surficial soil contamination, remedial alternatives were evaluated, and preferred alternatives were selected. In addition to the eight sites of concern at OU 2-13, there were 47 sites that were determined to pose no unacceptable risk to human health or the environment and were identified by the agencies as recommended "No Action" alternative sites. A Proposed Plan that summarized the results of the RI/FS and presented the preferred remedial alternatives was released by the agencies for public review on March 10, 1997. Public review of this document took place between March 10, 1997, and April 9, 1997. An additional 30-day review period (to May 9, 1997) was requested and used by the Shoshone-Bannock Tribes. Public meetings were held in Idaho Falls, Boise, and Moscow, Idaho, on March 25, 26, and 27, 1997, respectively.

This Responsiveness Summary responds to both written and verbal comments received during the public comment period and meetings. Generally, support for the selected alternatives for each site was mixed.

A-2. BACKGROUND ON COMMUNITY INVOLVEMENT

In accordance with Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Sections 113(k)(2)(B)(I-v) and 117, a series of opportunities was available for public information and participation in the remedial investigation and decision process for OU 2-13, WAG 2 of the TRA, from 1991 to the present. For the public, the activities included receiving fact sheets that briefly discussed the status of investigations to date, *INEEL Reporter* articles and updates, a Proposed Plan, and focus group interactions, including teleconference calls, briefings, presentations, and public meetings.

On March 10,1997, the U.S. Department of Energy, Idaho Operations Office (DOE-ID) issued a news release to more than 100 media contacts concerning the beginning of a 30-day public comment period pertaining to the WAG 2 TRA Proposed Plan, which began March 10, 1997, and was extended to May 9, 1997. In addition, a fact sheet was sent to approximately 6,700 people on the INEEL Community

Relations Plan mailing list. Both the news release and fact sheet gave notice to the public that WAG 2 TRA investigation documents would be available before the beginning of the comment period in the Administrative Record section of the INEEL Information Repositories located in the INEEL Technical Library, the INEEL Boise Office, and public libraries in Fort Hall, Pocatello, and Moscow, Idaho. Following the announcement of the public comment period, 6,700 copies of the Proposed Plan were mailed to the public for their review and comment. In addition, public meetings were held at Idaho Falls, Boise, and Moscow, Idaho, on March 25, 26, and 27, 1997, respectively. Written comment forms were available at the meetings, and a court recorder was present at each meeting to record transcripts of discussions and public comments. A total of about 20 people not associated with the project attended the public meetings. Overall, 20 citizens provided formal comments; of these, 6 citizens provided verbal comments and 14 provided written comments.

This Responsiveness Summary has been prepared as part of the Record of Decision (ROD). All formal verbal comments, as given at the public meetings, and all written comments, as submitted, are included in the Administrative Record for the ROD. Those comments are annotated to indicate which response in this Responsiveness Summary addresses each comment. The ROD presents the preferred alternative for each site of concern and the recommendation for No Action for the remaining sites. The preferred alternatives were selected in accordance with CERCLA, as amended by the Superfund Amendments and Reauthorization Act, and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (the National Contingency Plan). The decisions presented in the ROD are based on information contained in the Administrative Record.

A-3. SUMMARY OF COMMENTS WITH RESPONSES

Comments and questions raised during the public comment period on the Proposed Plan for the WAG 2 Comprehensive RI/FS for OU 2-13 at TRA are summarized below. The public meetings were divided into an informal question-and-answer session and a formal public comment session. The meeting format was described in published announcements, and meeting attendees were reminded of the format at the beginning of the meeting. The informal question-and-answer session was designed to provide immediate responses to the public's questions and concerns. Several questions were answered during the informal period of the public meetings on the Proposed Plan. This Responsiveness Summary does not attempt to summarize or respond to issues and concerns raised during the informal part of the public meetings. However, the Administrative Record contains complete transcripts of these meetings, which include the agencies' responses to these informal questions.

Comments received during the formal comment session of the meetings are addressed by the agencies in this Responsiveness Summary. The public was requested to provide their comments in writing, verbally during the public meetings, or by recording a message using INEEL's toll-free number.

Comments on the Remedial Investigation Process

1. **Comment**: One commentor expressed concern that the investigative process not only repeated work already performed but ignored prior research, and felt that we should use all the results, not just recent results. He also mentioned some concerns related to chromium and strontium-90 in the aquifer and noted the studies should be as technical as possible. (T-I1, T-I6, T-I7, T-I8)

Response: It is acknowledged that much of the groundwater investigative work is very similar to work that has been conducted by the U.S. Geological Survey (USGS) for many years. All past and present available sources of information, including USGS sources, have been used to evaluate the site risks and extent of contamination at TRA. Sources of information used to evaluate site-specific risks can be found in the technical site-specific summary reports (i.e., Track 1 and Track 2 documents) for each site. Track 1 and Track 2 technical information can be found in the Administrative Record for WAG 2.

2. **Comment**: Even though one commentor thought that the investigations were thorough and that future monitoring would not be needed, another commentor brought up the "Hot Tree" incident and hopes that 20 or 30 plants across the site would be sampled. (W-11, W-30)

   Response: The scope of site-wide ecological sampling is being established during the OU 10-04 Comprehensive RI/FS. Other trees in the vicinity of the Hot Tree Site were sampled and found not to be contaminated. In addition, the CERCLA risk assessment process evaluates plant uptake factors for exposure scenarios such as ingestion of homegrown produce at sites of concern. The results of these risk evaluations help guide the type of remedial activity that is necessary to protect human health and the environment.

   There are several other entities that conduct ecological surveys across the site. They are the Radiological and Environmental Sciences Laboratory at the Central Facilities Area and the Environmental Research and Science Foundation in Idaho Falls. Copies of their survey reports can be made available to the public by calling 1-800-708-2680.

3. **Comment:** A commentor asked that audits and certification be conducted before remediation is approved, and that the applicability of ISO 14001, 4.4.4 be addressed. (W-1)

   Response: The CERCLA remedial action process requires pre-final and final inspections at completion of construction activities for long-term remedial actions or at completion of remediation for short-term remedial actions. The purpose of the inspection is to determine if all aspects of the plans and specifications have been implemented at the site and are performed with the U.S. Environmental Protection Agency's (EPA's) and State of Idaho's review, concurrence, and resolution of outstanding issues.

   In response to issues and needs identified in a recent DOE-ID and Lockheed Martin Idaho Technologies Company (LMITCO) assessment, LMITCO is initiating efforts to develop a LMITCO Environmental Management System (EMS). The objective of the EMS is to reinforce accountability for compliance and provide the tools and systems to achieve compliance. The framework for the system is based on ISO 14001, the international EMS standard.

4. **Comment**: One commentor stated that the cover's performance cannot be evaluated until it is designed and demonstrated, all of which should take place before the ROD is signed, not after. (W-42)

Response: The CERCLA remedial action process provides that alternatives are generally analyzed as part of the RI/FS process. However, resources are not spent developing specific details and specifications until the remedy is actually selected in the ROD.

The general barrier design anticipated for the Warm Waste Pond, for example, was implemented for the INEEL Stationary Low-Power Reactor (SL-1) closure cover. The long-term performance of this alternative is considered to be highly effective for preventing external exposure to contaminated surface soil. This basic design will be evaluated and modified as needed during the post-ROD remedial design process. See Sections 7 through 11 of the *Comprehensive Remedial Investigation/Feasibility Study for the Test Reactor Area Operable Unit 2-13 at the Idaho National Engineering Laboratory* (the OU 2-13 Comprehensive RI/FS) for additional supporting information.

5. **Comment**: One commentor noted that the Diesel Unloading Pit had an unlined soil and sand floor, rather than a concrete floor as expected. The commentor wanted to know when this was discovered and what other structures are constructed differently than expected. (W-28, W-29)

   Response: The Diesel Unloading Pit is the only site of concern at TRA known to have been constructed differently than expected. All other sites were found to be consistent with current documented construction descriptions. If new information is discovered in the future regarding these sites, this information will be considered and acted upon in the CERCLA 5-year review process. If the new information demonstrates that the selected remedy is fundamentally no longer valid to protect human health and the environment, then the CERCLA process provides that this decision would be revisited through a ROD amendment.

6. **Comment**: One commentor felt that, because the maximum concentration of contaminants detected was not reported simultaneously with the maximum contaminant levels (MCLs), it showed a "trivialized characterization of the problem." (W-M9)

   Response: It should be noted that MCLs only have meaning when compared to contaminant levels in drinking water or the aquifer. It would be misleading to list an MCL for soil because MCLs apply only to drinking water. Risk-based soil concentrations (which are analogous to MCLs for water) were thoroughly documented and listed in Appendix B of the OU 2-13 Comprehensive RI/FS.

7. **Comment**: A commentor felt that No Further Action for polychlorinated biphenyls (PCBs) was insufficient because 24 ppm is 96% of the limit of 25 ppm. (W-25)

   Response: While the PCB level is 96% of the 25-ppm limit, it is still below the limit. The 25-ppm limit for PCBs was established as part of the Toxic Substances Control Act (TSCA). The limit has been used as the basis of remediation at industrial PCB release sites located across the country. Because TRA is an industrial facility, 25 ppm is the standard to which cleanup would have taken place. Because the limit is protective of human health and the environment and none of the PCBs detected at the TRA release sites exceed the limit, no remediation of PCBs is necessary.

8. **Comment**: A commentor noted that remedial actions were being delayed because operations were ongoing. The commentor stated that the delays indicate that operations are more important than remediation, which the commentor held was unacceptable. (W-M32)

Response: The commentor is correct in stating that remediation of two sites (the Brass Cap Site and TRA-19) is being postponed until active operations in the vicinity are ended. The postponement is due to these two sites current inaccessibility and the lack of assurance that adequate cleanup could be achieved to eliminate the need for controls. Because the contamination is in the subsurface, there is no exposure to workers as long as the institutional controls are maintained. However, if the sites posed an immediate, unacceptable risk, remediation would not be delayed in favor of operations.

Comments on the Remedial Investigation Process: Contaminants

9. **Comment**: Two commentors listed contaminants that they felt should have been included in the RI/FS: tritium, carbon-14, uranium-234, neptunium-237, iodine-129, plutonium-238/239/240, nickel, zinc, lead, copper, ammonium; cyanide; benzene, diesel oil, kerosene, xylene, nitrates, nitrites, sulfates, and phosphates. (T-M1, W-M20)

Response: All contaminants that were detected during sampling at the TRA release sites were included in the RI/FS. These sampling investigations were conducted in a systematic manner that begins with a complete listing of all contaminants suspected of being present or those that are detected. This list is then screened on a site-by-site basis to determine the presence or absence of the contaminant at each site. Once this is completed, risk calculations are made based on the concentrations found. Contaminants that pose no risk are screened out. To be considered a contaminant of concern, risk analysis must indicate a potential unacceptable level of risk posed by the given contaminant. The contaminants identified by the commentor were given consideration during the RI/FS and received detailed analysis in the RI/FS, but they may not have been identified as contaminants of concern in the Proposed Plan. Two of the contaminants listed by the commentor (diesel fuel and kerosene) are not examined as such but are measured by their constituent products (xylene, benzene, etc.).

10. **Comment**: One commentor noted a comment by the State during the perched water investigation, OU 2-12, that the perched water zone may extend farther to the north than DOE recognized. In addition, he said that because the plume is connected to the Big Lost River flood zone, contaminants could be transported rapidly to the deep zone. (W-M14, W-M16, W-M17)

Response: These issues were evaluated during the previous OU 2-12 remedial investigation and resolved with the State. Flooding of the Big Lost River was modeled as part of that investigation. Analysis indicated that the Big Lost River has a very minor impact, if any, on the edge of the TRA perched water bodies compared to the volume of water being discharged as a result of routine operations. The No Action (with monitoring) decision finding from the investigation and resulting Record of Decision is still valid.

Comments on Risk Assessment

11. **Comment:** One commentor questioned whether it is reasonable to assume that a receptor (resident) would actually be exposed to contaminants at the site, and where that reasonableness is taken into consideration during the risk assessment process. (T-I9, T-I16)

    Response: It can be difficult to predict resident exposures 100 years into the future with certainty. However, it is reasonable to expect that government control will be maintained for at least 100 years. At that point, it is assumed for purposes of a CERCLA baseline risk assessment that a resident could live at TRA. The residential scenario, whether likely or not, is evaluated in the risk assessment process based on guidance from the agencies, and this conservative assumption is intended to ensure that cleanup alternatives are protective.

12. **Comment:** One commentor wanted to know which risks (by pathway) are current (during the institutional control period) and which risks will only be present in the future (after the institutional control period). Therefore, is the present construction of an engineered cover justified, even though it will increase risk to the groundwater? (W-32, W-35, W-36)

    Response: Table 1 of the Proposed Plan presents the calculated risks for workers and potential future residents at the TRA release sites. These risks were calculated assuming that no remedial actions would be taken at any of the TRA sites and that access controls to the sites would not be left in place. The results presented in Table 1 are the sum of risks calculated for workers and residents across all exposure pathways after an evaluation of contaminant ingestion, inhalation, and external radiation exposure. Details of these individual pathway risks can be found in Section 5 of the OU 2-13 Comprehensive RI/FS.

    The plan for constructing an engineered barrier over the Warm Waste Pond was developed to ensure that the pond's contamination would not be spread by wind erosion, and workers or potential future residents at the site would not receive radiation exposures from the pond's contamination. In addition, the barrier was developed to inhibit future excavation or intrusion into the contamination.

    It is true that the design will reduce evapotranspiration, which could result in more infiltration. In response to the commentor's concern about the increased hydraulic load to the aquifer as a result of an engineered cover, DOE re-ran the hydrologic models. The models increased the potential amount of flow into groundwater that would result from the engineered cover. Even considering the commentor's concern and a conservative doubling of infiltration, risk does not significantly increase and remains within acceptable risk levels.

13. **Comment:** One commentor, noting the graph of probable cancer per 10,000 exposed individuals, stated during the public meeting that the rate of 1 in 10,000 is not determinable in this population and, therefore, should not be used as a goal or as a limit, since its attainment cannot be proven. (W-53)

    Response: The 1 in 10,000 does not mean 1 person in 10,000 would contract cancer. It is a probability that any person exposed at those contaminant levels would contract cancer. As part of the Comprehensive RI/FS described in the OU 2-13 Proposed Plan, DOE worked closely with EPA and the State to ensure that risk assessment methods, including calculating risk probabilities, are in accordance with EPA guidance. These methods have been used to consistently evaluate risks associated with the TRA release sites and to identify the sites that have a potential for producing risks that exceed the CERCLA acceptable risk range.

Comments on Risk Assessment: Groundwater

14. **Comment:** A commentor cited the problem with cesium-137 levels in perched water: 176,000 times over the MCL, which will take 500 years to decay down to MCL levels, and will migrate into the aquifer, which is already considerably over drinking water standards. (T-M5, W-M12)

Response: The commentor's suggestion that cesium-137 levels in the perched water are 2,000,000 picocuries per liter (which is 176,000 times the MCL is incorrect. The highest level of cesium-137 detected was 9,920 picocuries per liter (80 times the MCL) in one shallow well at TRA in 1980. Cesium was last measured in this shallow well at 1,600 picocuries per liter (13 times the MCL).

Cesium-137 quickly absorbs to the soil or rock medium through which it passes. Therefore, it is not considered a threat to the aquifer because it will quickly become bound to subsurface material, where it will remain until it decays. This is demonstrated by the lack of cesium-137 migrating to the Snake River Plan Aquifer to date, including when discharge to the Warm Waste Pond was taking place at over 2 million gallons per year. Although it is acknowledged that Cs-137 levels in the shallow perched water are by no means trivial, models and historic monitoring indicate that cesium levels in shallow and deep perched water will not reach the aquifer at levels that could pose a risk. Therefore, this ROD does not alter the previous No Action with Monitoring decision for OU 2-12.

15. **Comment:** One commentor felt that residents would never need to inhabit the site, so the residential scenario for risk assessment is not necessary. Conversely, another commentor wondered how we would protect the residential use of the site after institutional controls are lifted and felt that the No Action decision is risky. (W-13, T-M5)

Response: As stated in the response to Comment 11, the assumption that someone will someday move to TRA is a conservative assumption that was made for risk assessment purposes. People may never live at the site, but we can be reasonably assured that no resident would be adversely impacted by the existing contamination if a potential future resident at the site in 100 years can be protected.

The No Action decision was recommended for sites that do not pose unacceptable residential exposure risks. Where contaminant releases have occurred, the risks were calculated in a conservative manner, indicating it is unlikely that minor contamination left in place at the sites will one day cause adverse health impacts to future residents. These decisions will be reevaluated to ensure that land use assumptions remain valid as part of the CERCLA 5-year review process.

16. **Comment:** A commentor thought that the Proposed Plan was inadequately reviewed regarding the effects of its preferred alternatives on the future groundwater pathway risk. (W-46)

Response: The OU 2-13 Comprehensive RI/FS Report and the Proposed Plan received numerous technical reviews, including reviews internal to LMITCO followed by reviews by EPA and the State. Areas of review include risk assessment, environmental compliance, quality assurance, groundwater, and legal.

Comments on Risk Assessment: Groundwater Modeling

17. **Comment**: One commentor referred to findings that revealed the presence of lava tubes that move water rapidly through the aquifer and exit at Thousand Springs. The commentor stated that it is unjustified and unacceptable for DOE to contend that "there is no current use of the perched water or contaminated Snake River Aquifer in the vicinity of TRA." The commentor questioned the decision to consider the potential use of the area for only a 125-year period. (W-M23)

Response: Lava tubes have been identified in the Snake River Plain basalts, but they are localized characteristics of the area's basalt flows. There is no evidence to suggest the possible presence of intact, uncollapsed lava tubes that could transport groundwater over very large distances beyond the INEEL to Thousand Springs.

DOE monitors drinking water wells at TRA to ensure that they are not producing contaminated water. If contaminated water were to be detected at one of these wells, measures would be taken to ensure that workers have clean drinking water. DOE also routinely monitors wells located off the INEEL in an attempt to detect groundwater contamination before it could reach water users downgradient of the site. Very little contamination has ever been detected in these off-site wells, and contaminant concentrations detected have been well below drinking water standards. Groundwater monitoring also is conducted independently by USGS and the State's INEEL Oversight Program.

All of the action decisions recommended in the Proposed Plan were based on risks that are expected within the next 100 years, but the OU 2-13 Comprehensive RI/FS evaluation was not limited to this time frame. The RI/FS includes analysis of a residential exposure scenario in 1,000 years, including computer modeling of groundwater. Remedial action objectives have been established to ensure that remediation will remain protective of human health and the environment until contaminant concentrations decrease to an acceptable level.

Comments on Risk Assessment: Ecology

18. **Comment**: Two commentors noted that the risk assessments consider occupational and residential scenarios but include very little biological monitoring. They felt that other scenarios, including Native American subsistence and recreation, should be considered. (T-M2, W-M26)

Response: In addition to the occupational and residential exposure scenarios, Native American subsistence and recreation scenarios were also considered but not evaluated individually. The residential scenario that is evaluated is the most conservative scenario (i.e., exposure to contaminants is greater, or more protective, under the residential scenario than under any other scenario). For this reason, the residential scenario provides the highest degree of protection.

19. **Comment**: One commentor wanted to know why the Paint Shop Ditch, the Radioactive-Contaminated Tank at TRA-614, and the Advanced Test Reactor Cooling Tower are not included as sites with human health risks greater than allowable levels. (W-19)

Response: All of these sites were included in the WAG 2 Comprehensive RI/FS. They were each evaluated in a manner that was consistent with the other sites in the RI/FS, and were found to have risks below the 1 chance in 10,000 threshold. Details on the risk assessment for the sites can be found in Section 5 of the OU 2-13 Comprehensive RI/FS.

Comments on Risk Assessment: Contaminants

20. **Comment**: Several commentors suggested that the actual values should be provided, rather than stating that concentrations are above MCLs or making unquantified statements. Also, one commentor wondered why tritium and chromium pose a health hazard even though they are below MCLs. (T-I9, W-16, W-21, W-M25, W-54)

Response: The commentor's implication that a reader is better informed when actual contaminant concentrations (values) detected are used in the Proposed Plan is well taken. In the future, greater care will be given to providing actual concentrations (values) in the documents written for public review. A complete description of the WAG 2 contaminant sampling investigations, including the detected contaminant concentrations (the actual values) in groundwater, is available and can be found in Section 4.4 of the OU 2-13 Comprehensive RI/FS.

With regard to the last concern noted above, tritium and chromium are the only two contaminants that currently *exceed* MCLs in the groundwater beneath TRA. Groundwater modeling of these contaminants predicts that they will be below MCLs before the end of the 100-year INEEL institutional control period. As a result, no one is expected to be exposed to these contaminants at concentrations that could cause adverse health effects.

21. **Comment:** One commentor asked if arsenic concentrations are currently below detection limits, why will there be concentrations producing risks of 3 chances in 1,000,000 at approximately 1,000 years in the future? (W-18)

Response: Arsenic is naturally occurring in soils and groundwater at TRA. Groundwater modeling predicts that the arsenic could migrate from surface soils down to the aquifer within 1,000 years. This migration would be caused by arsenic dissolving in rain and snowmelt moving through the unsaturated zone beneath TRA. The model predicts that the maximum risk from drinking arsenic-contaminated groundwater would be 3 chances in 1,000,000, and that risk would occur in 1,000 years. The fact that arsenic emerges as a contaminant of potential concern demonstrates the conservative nature of the risk assessment process.

22. **Comment:** One commentor stated that DOE should not eliminate from consideration those isotopes with half-lives greater than 5 years, especially cesium. He wondered if DOE would walk away from sediments with high concentrations of cesium, and wanted to know which worst-case conditions were used for cesium to approach National Contingency Plan limits. (W-M22, W-M27, W-M30)

Response: The WAG 2 Comprehensive RI/FS did not eliminate any radionuclides from consideration based solely on radioactive half-life. All contaminants were evaluated for their potential to cause adverse impacts to human health and the environment, and contaminants that have the potential for producing adverse impacts were considered in the RI/FS. Cesium was one of the many contaminants that was retained for evaluation in the RI/FS, and its presence is the reason for many of the remedial action recommendations presented in the OU 2-13 Proposed Plan.

23. **Comment**: A commentor stated that the combined cancer risks for inhalation should be considered. Because risk from radionuclides is close to the National Contingency Plan limit, will the combined radionuclide and nonradionuclide risk be over the limit? (W-M24)

Response: The WAG 2 risk assessment considered the combined risks from multiple exposure routes, including inhalation and ingestion. For any site where the combined risks are over the acceptable limit, remedial action is being recommended. The "worst-case" conditions evaluated for soil ingestion assume that, in 100 years, a resident lives on the contaminated site for 30 years, 350 days per year, 24 hours per day, and ingests 100 milligrams of dirt per day.

24. **Comment:** One commentor contended that the sediment contains hazardous waste despite DOE's claims to the contrary. Also, even though DOE's tests show that the contaminants did not leach, how did perched water become highly contaminated if not through leaching? (W-M31)

Response: It is acknowledged that hazardous substances are contained in the sediments and soils at a number of release sites; hence, the need for investigation and cleanup. Hazardous wastes as defined by the Resource Conservation and Recovery Act (RCRA) were not generally disposed of at TRA with few exceptions. New information does suggest that, during its more than 40 years of existence, the Warm Waste Pond received minute quantities of RCRA-listed hazardous wastes. More information can be found in Section 9 of the ROD.

Direct infiltration of water that was disposed of in the Warm Waste Pond is the primary source of the vast majority of contamination in the pond sediments and the TRA perched water. This water contained contaminants that were produced by operations at TRA, and the discharge carried the contaminants directly to the perched water bodies. Contaminants leaching from sediments are not a significant continuing source of contamination. All discharges to the unlined Warm Waste Pond were discontinued in 1993, and there is no more contaminated water infiltrating to the perched water bodies from the Warm Waste Pond. Contaminated discharges from the TRA reactors that previously went to the Warm Waste Pond are now being sent to a lined disposal pond that does not allow water to infiltrate into the subsurface. All discharges to the disposal ponds will eventually cease, at which time the perched water bodies are expected to begin to dissipate.

Comments on Risk Assessment: Land Use

25. **Comment**: One person said that evaluation of risk at 100 years is not sufficient; it should be evaluated for 1,000 years or more. (T-M3)

    Response: The assumption that in 100 years someone will actually build a home and live at TRA was made for the purpose of the comprehensive risk assessment. The evaluation was made because it is conservative. If the site can be remediated to be protective of human health and the environment in 100 years, it is anticipated to stay that way until contaminant concentrations decrease to acceptable levels and farther into the future. Additionally, this assumption is consistent with the Long-Term Land Use Future Scenarios for the Idaho National Engineering Laboratory.

    All of the action decisions recommended in the Proposed Plan were based on risks that are expected within the next 100 years, but the WAG 2 Comprehensive RI/FS evaluation was not limited to this time frame. The RI/FS includes analysis of a residential exposure scenario in 1,000 years, including computer modeling of groundwater.

Comments on Alternatives

26. **Comment**: Several commentors said that efforts should be concentrated on the Chemical Waste Pond and the Warm Waste Pond to ensure that contaminants (especially mercury) are isolated and do not pollute the aquifer anymore. Also, a commentor suggested that the engineered cover needs to be demonstrated and reevaluated to see if it is really the best alternative for the long term as well as short term. (T-I2, T-I3, T-I10, W-33)

    Response: The primary contaminant of concern at the Chemical Waste Pond is mercury. Contaminants of concern at the Warm Waste Pond include cesium-137, cobalt-60, and chromium. Computer modeling using GWSCREEN shows that these contaminants do not migrate readily to the aquifer. Annual average precipitation at the INEEL is approximately 10 cm per year. Infiltration rates as high as 23 cm per year have been modeled and have shown that residual contamination would not be expected to add to the cumulative risk in the aquifer. Essentially, the model tells us that more than two times the average annual precipitation could fall on sites of concern and the contaminants at the source still would not likely migrate to the aquifer.

    The engineered cover is designed to isolate radioactive waste and to reduce surface exposures to background levels. This barrier design was implemented for the INEEL Stationary Low-Power Reactor (SL-1) closure cover. The long-term performance of this alternative is considered to be highly effective for preventing external exposure to contaminated surface soil. This basic design will be evaluated and modified as needed during the post-ROD remedial design process. Sections 7 through 11 of the OU 2-13 Comprehensive RI/FS contain additional cover design information.

27. **Comment**: One commentor wanted to know where excavated, contaminated materials (such as those from the Cold Waste Pond) were to be emplaced. Will they be shuffled around the INEEL

to temporary locations, or when and where will they be permanently disposed of? (W-15, W-20, W-23, W-24)

Response: The disposal location for these materials will be determined during remedial design. It is reasonable to expect that soil excavated from the Cold Waste Pond will be placed in the adjacent Warm Waste Pond cell to reduce the "footprint" of contaminated soil at the TRA facility and because they contain the same contaminants. The Warm Waste Pond cells will then be covered by an engineered barrier that is designed for the length of time needed for radioactive contaminants in soil to decay within acceptable levels.

28. **Comment**: One commentor thought that the publications were valid and informative and that Alternative 3b is by far the best choice based on cost and the environment. (W-10, W-12)

Response: The Agencies agree that Alternative 3b, containment by capping with a native soil barrier is the preferred alternative at the Chemical Waste Pond and the Sewage Leach Pond based on effectiveness, cost, and the other evaluation criteria discussed in the Proposed Plan. This alternative appears in the ROD as the selected remedy for the Sewage Leach Pond and the Chemical Waste Pond.

Comments on Alternatives: Evaluation

29. **Comment**: One commentor felt that the short-term effectiveness rating for the Containment with Engineered Cover alternative was inaccurate because it rated the alternative as "good" for this criterion. The commentor stated that the alternative increased risks to the aquifer and posed additional worker risk in the short-term. Therefore, the alternative deserved to be ranked lower than the other alternatives. For the same reasons, the commentor also questioned the selection of the preferred alternative for the 1957 cell. (W-43, W-44)

Response: The plan for constructing an engineered barrier over the Warm Waste Pond was developed to ensure that the contaminated pond sediments would not be spread by wind erosion. This also ensures that workers at the site would not be exposed to radiation and that future intrusion or excavation would be inhibited. The proposed design of the cap could allow a small increase in the amount of water movement through the Warm Waste Pond sediments. Current modeling suggests that the increased infiltration expected by the design assumed in the Feasibility Study and Proposed Plan would not alter overall risk results. The commentor's observations concerning potential increased infiltration to the aquifer as a result of the cap and slight increases in worker risks in the short-term are legitimate. However, these concerns are not significant enough to adjust the relative rankings of the alternatives.

Comments on Alternatives: Cost

30. **Comment**: Commentors expressed concerns about the cost of covers and remedies with respect to their adequacy. Also, they stated that the public should know how much risk would be reduced per million dollars spent, but wondered if the calculations of risk to the public are reliable in the first place considering the uncertainty of whether the public will ever live at the site. (T-I12, T-I17, T-I18)

Response: One of the purposes of soliciting public comment on a Proposed Plan is to provide an opportunity for citizens to reflect their values concerning the expense of the proposed alternatives in relation to the benefits gained. A cost/benefit analysis of the various remedial alternatives for TRA releases was included as part of the WAG 2 Feasibility Study to illustrate the projected range of construction costs. Although risk reduction per dollar spent is not evaluated, this analysis considered the alternatives in terms of how well they met the nine CERCLA evaluation criteria versus the amount of money that would be spent to implement each alternative. The alternatives recommended in the OU 2-13 Proposed Plan produced the highest potential benefit-to-cost ratios when compared to other alternatives that could be implemented at each site. Cleanup is being recommended for sites that pose an unacceptable risk.

Comments on Alternatives: Design

31. **Comment**: One commentor wondered why we would use a native soil cover for the Warm Waste Pond 1964 cell when three of the criteria for such a cover are rated as poor. Because the native soil cover is combined with a riprap or cobble layer, it should really be called an "engineered cover." (W-22)

    Response: The 1964 cell of the Warm Waste Pond is different from the other two cells because the majority of contamination was removed and approximately 10 feet of clean soil were placed in the pond as backfill. Therefore, the criteria apply more directly to the other cells where higher levels of contamination were placed nearer to the ground surface. In the case of the 1964 cell, the existing soil cover is an effective remedy. However, consistent with the other two cells, a cobble layer will inhibit future intrusion potential. The cover was not defined as an engineered cover because there is no intent to engineer the cover design beyond the existing soil cover, with the exception of the cobble layer.

Comments on Alternatives: Monitoring

32. **Comment**: One person stated that groundwater monitoring in fractured rock aquifers is very difficult, expensive, and has a low probability of detecting groundwater contamination until the contamination is fairly widespread. He then asked, "Will there be vadose zone monitoring at any of the sites to warn of contaminant movement to the aquifer before contaminants reach the aquifer?" (W-51)

    Response: Groundwater monitoring has been conducted in and around the TRA since the late 1950s. The groundwater system is well understood because of the long history of monitoring. The groundwater monitoring network at the TRA under the OU 2-12 monitoring plan currently consists of six deep perched and three aquifer wells. This continued monitoring effort provides the necessary information for evaluation of contaminant migration trends between the perched water system within the vadose zone and the aquifer below. Therefore, no additional vadose zone monitoring will be performed at any of the sites.

Comments on Alternatives: Available Alternatives

33. **Comment**: One commentor stated that the failure to build a vitrification treatment plant identified in a 1977 EIS limited the RI/FS because fewer treatment alternatives were available. (T-M8)

Response: From a practical standpoint, existing treatment capabilities may be given special consideration during an RI/FS. However, the lack of an onsite treatment facility in no way limits the technologies or alternatives considered during an RI/FS. New treatment facilities have been constructed to implement other INEEL RODs. Vitrification of contaminated soils was considered and eliminated as a viable alternative in the Feasibility Study. For more information about this proposed treatment, see Section 7.6 of the OU 2-13 Comprehensive RI/FS.

Comments on Groundwater

34. **Comment**: Several commentors stated that, because contamination in perched water will get into the aquifer eventually, we should pump and treat the perched water immediately and that we should monitor contamination levels after 20 years, then every 5 years after that. (T-M10, T-B1, T-B4, W-M13)

Response: Groundwater contamination produced by the perched water system infiltration and disposal well injection was evaluated as part of the OU 2-12 perched water system remedial investigation in 1992. A ROD was signed for the TRA Perched Water System in December 1992. In that ROD, it was determined that no remedial action was necessary for the perched water system at the TRA, and the agencies continue to support that decision. This decision was based on the results of the human health and ecological risk assessments, which determined that conditions at the site pose no unacceptable risks to human health or the environment for expected current or future use of the Snake River Plain Aquifer beneath the perched water system at the TRA.

In addition, it was determined in the ROD that groundwater monitoring would be conducted to verify that contaminant concentration trends follow those predicted by groundwater computer modeling. Based on 3 years of monitoring, the expected contaminant concentration patterns have been observed for most wells. In some cases, expected declines in tritium and chromium concentrations have not occurred, but concentrations are well below predictions in the OU 2-12 Perched Water RI/FS. Discontinuance of the discharges to the Warm Waste Pond appears to have caused a reduction in most, but not all, of the deep perched water wells. There has been a decline in hydraulic heads in the deep perched water system, but that decline appears to have been caused primarily by reduced discharges to the Cold Waste Pond. Contaminant flushing in the deep perched water system varies widely with location because of variations in hydraulic properties and the possible mixing and lateral spreading of the infiltration water and contaminants in the shallow perched water system. Continued monitoring of the perched water system and the aquifer is recommended in this OU 2-13 ROD.

35. **Comment**: A commentor stated that contaminated perched water should be pumped and treated. It was recommended that this be done using funds from nuclear material production. The commentor noted that groundwater contaminants behave in a variety of ways that raise

environmental and public health concerns. To address this, contaminated groundwater should be removed. (W-M18)

Response: The No Action (with monitoring) decision for the perched water below TRA was officially adopted upon the signing of the OU 2-12 ROD in 1992. No new information was developed during the OU 2-13 RI/FS to alter that decision or to justify expenditure of federal funds, regardless of source.

With respect to contaminants in groundwater, each contaminant may behave differently. That is why a remedial investigation seeks to identify the contaminants causing unacceptable risk. The behavior of these contaminants is studied, modeled, and considered when developing alternatives and selecting a preferred alternative (see the OU 2-12 Perched Water ROD for more information on why the agencies determined they would monitor rather than remediate groundwater). Please refer to the response to Comment No. 20 in regard to tritium and chromium concentrations in the groundwater below the TRA. Contaminant concentrations are predicted to fall below MCLs before the end of the 100-year INEEL institutional control period.

36. **Comment:** Three commentors felt that, because of the nature of the contamination (how the data peaks and trails off) and the nature of the aquifer (as a natural filter), there is no need to be concerned about the perched water because it will go away and the contamination will not get in the springs if dumping is stopped now. (T-I11, T-I14, T-I20)

Response: Computer modeling and monitoring data support the comment. Contaminant levels in the aquifer have steadily decreased since contaminant discharges ceased and are expected to continue to decrease to within acceptable levels before reaching future residents on or off what is now the INEEL. Please refer to the response to Comment No. 20 in regard to tritium and chromium concentrations in the groundwater below the TRA. Contaminant concentrations are predicted to fall below MCLs before the end of the 100-year INEEL institutional control period.

37. **Comment**: Commentors asked why strontium was not identified in addition to the cesium, especially because strontium is more mobile than cesium and has been detected since 1964 in the deep perched water zone. (T-I24, T-I25)

Response: Strontium-90 is identified as a contaminant of concern at the TRA surface sites and was evaluated in the risk assessment to determine the risk associated with exposure to this contaminant. As a contaminant of concern, strontium-90 contributes to the overall risk at the site. Remedial action will be conducted at those sites where the cumulative risk, of which strontium-90 is a contributor, exceeds acceptable levels. Note that sampling and analysis of strontium-90 will continue under the OU 2-12 ROD for both the deep perched water system and the aquifer.

Comments on Infiltration

38. **Comment**: Several commentors suggested the need for an infiltration barrier. Many commentors felt that the existing native soils or a bentonite seal cover would contain contaminants better than an engineered barrier, and that an engineered barrier would keep animals out but would increase the infiltration rate into the aquifer. In addition, they asked for results of containment studies and

comparisons. The commentors stated that, because the engineered barrier described in the Proposed Plan does not decrease infiltration, it is not really a containment barrier, so the name of Alternative 3a should not have the word "containment" in it. Also, using the native soils as a containment barrier should be a completely separate alternative. (T-I4, T-I5, T-I13, T-I15, T-I22, W-5, W-6, W-31, W-34, W-37, W-38, W-39, W-40, W-41, W-49, W-50, W-52)

Response: Based on computer modeling, in no case did the model predict that contaminants at the surface sites would migrate to the aquifer at concentrations of concern. This was true even when twice the annual average precipitation (23 cm/year) was input into the model. That was an important consideration when evaluating the two cover designs. Because migration of contaminants to the aquifer does not appear significant, the focus of the cover designs has been to inhibit exposure of contaminants to current and future receptors, rather than to prevent migration of those contaminants to the aquifer.

Though the use of an engineered barrier may increase the infiltration rate, computer modeling of two times the average infiltration shows that the risk to groundwater does not increase substantially. Both the engineered barrier and the native soil barrier were evaluated separately during the Feasibility Study. Results of the study evaluating these two barriers can be found in the OU 2-13 Comprehensive RI/FS Report contained in the Administrative Record.

39. **Comment**: Commentors asked what would happen if, after the engineered barrier is in place, future information indicates the barrier is ineffective? Would the barrier be removed? Why not put the engineered barrier in place in the future after institutional controls are removed? (W-45, W-47, W-48)

Response: Leaving the cover off would require that limited actions (institutional controls) be implemented. The Limited Action alternative was evaluated during the RI/FS and did not meet remedial action objectives as effectively as installation of an engineered barrier. The CERCLA process requires a review at least every 5 years after remedial action is completed to determine and ensure that the remedial action continues to be protective of human health and the environment. If, during that review, it is determined that the remedial action no longer is protective, then the agencies could determine what appropriate action would be necessary. If a fundamental change in the remedy were determined to be appropriate, a ROD amendment, including public comment, would be initiated.

Comments on Public Involvement

40. **Comment:** Some commentors stated that the documents and meetings should better educate the public. This should include providing specific numbers and facts, such as comparing contaminant levels to regulatory limits (e.g., drinking water standards) that indicate the magnitude of the contamination relative to a baseline. Another commentor stated that presenters should be better prepared and should not present conflicting information. Another commentor raised concerns about communication needing to be clear and to avoid the "fear factor" that might affect communication. Also, one commentor felt that the focus group did not reveal the true feelings of the participants. (T-M4, T-B2, T-B3, T-B5, W-M21, W-4, T-M9)

Response: As a result of a citizen's focus group held to review the draft Proposed Plan and accompanying fact sheet, a number of statements were added to the text of the final documents to add candor and acknowledge problems caused by the release of contaminants to the environment. With reference to the need for providing specific facts and comparisons of contaminant levels (such as drinking water standards) and not down-playing or trivializing the presence of contaminants, the agencies will continue to pursue improved methods to communicate information to the public. Because there are no legal standards dealing with or regulating concentrations of contaminants in soil similar to those for drinking water, risk-based standards are used or calculated. The DOE will reference established standards, when applicable, to aid citizens in determining when contaminant levels exceed legal standards.

Presenters strive to be prepared and have facts at hand but are subject to unintentional mistakes. When occasional contradictions arise during public presentations concerning proposed cleanup plans, the agencies will make every effort to have the issue resolved during the discussion. Meeting facilitators are instructed to provide the attention necessary to either resolve the conflict or ask the agency representatives to provide a response to the interested parties.

In response to one commentor's request, focus group members were polled concerning their feelings about the agencies' preferred alternative. Each focus group member was called and asked their opinion of alternatives proposed by the agencies. One person opposed the agencies' recommendation; three people would have liked more of an aggressive remedial action; one person felt that even though they supported the alternative, the recommendation went farther than it needed to; and three people agreed with the recommendation. (The original intent of focus group review of the draft documents was to offer suggestions concerning readability, layout, completeness, and user friendliness rather than concerning the remedies.)

41. **Comment:** One commentor stated that the information presented at the public meeting was important and educational, and lamented the fact that only one citizen attended. The commentor observed that some people spread the idea that the greater the fear—the greater the risk.. (T-B2, T-B3, T-B5)

Response: The agencies would receive greater benefits if increasing numbers of citizens would interact with project managers during the open public comment periods. Citizens are invited to evaluate and suggest new methods of communicating and improving public participation.

42. **Comment:** While critical of aspects of the project, a commentor stated that it was good that the environmental and public issues were being addressed. (T-I21)

Response: Comment noted.

43. **Comment:** One commentor representing a group wanted an extension for comments. (W-3)

Response: In response to the request for an extension, the agencies extended the public comment period an additional 30 days.

44. **Comment:** One commentor supported the plan and implementation. (W-8)

Response: Comment noted.

45. **Comment:** One commentor asked whether access to public comments was available on the Internet. (W-2)

Response: All public comments received at the public meetings and compiled into meeting transcripts are available on the Internet under the OU 2-13 Comprehensive RI/FS at http://ar.inel.gov/home.html.

46. **Comment**: One commentor expressed frustration that public meeting dates were changed. (T-M7)

Response: With regard to having published different meeting dates in the draft and final plans, the DOE acknowledges and regrets the confusion that may have resulted from changes in meeting dates. The original intent of the draft, which contained tentative dates, was to allow eight focus group members an opportunity to review the user friendliness of the plan, and it was meant to be draft information. Following the review of the draft plan, the meeting dates were confirmed in the release of the final plan.

Comments on ER Programmatic Issues/DOE

47. **Comment:** A commentor noted that the contractor who operates the facility profits from expenditures on remediation, creating an incentive to pollute. The commentor also expressed concern about DOE self-regulation with respect to radioactive materials and called for an independent agency to oversee DOE activities. (W-M34)

Response: While having responsibilities for operations and environmental remediation may create a perception of an incentive to pollute, it is not believed to be true. Contractor incentives and awards as well as fines and penalties are based on compliance with environmental requirements. Deliberate actions of this nature would constitute prosecutable criminal behavior. The commentor's desire for independent oversight of DOE activities is achieved through State and EPA oversight of remedial actions.

48. **Comment:** The Shoshone-Bannock Tribes commented that they are primarily concerned that the contamination that has accumulated at the INEEL over the past 50 years will be cleaned up or mitigated to the maximum extent possible. In addition, all efforts should be made to alleviate impacts to the health, welfare, safety, and cultural and treaty rights of the Tribes and others on the Snake River Plain. The Tribes voiced the imperative need to respect and restore the environment. (W-14)

Response: The restoration process at the INEEL is designed to alleviate adverse impacts to human health and the environment. The long-term effects of accumulated contamination are addressed in this process, and risk-based review and cleanup provide the most effective means to identify, mitigate, and correct past practices.

Concerns With Previous Decisions

49. **Comment:** Several commentors expressed concerns about radionuclides (strontium-90 and cesium-137) not being permanently isolated in the Warm Waste Ponds. The commentors also expressed concerns about problems related to hot waste tanks TRA-15, TRA-16, TRA-19, and TRA-603/605. They stated that DOE is ignoring its cleanup responsibilities and should pursue containment strategies more aggressively. (T-M11, W-M10, W-M11, W-M15, W-M19, W-M28, W-M29, W-M31a, W-M33)

Response: It is recognized by DOE, EPA, and the State that there are a number of cleanup technologies that could have been or could still be applied at contaminated sites and that there are a number of opinions concerning what would be most effective. However, as stated in the Warm Waste Pond and the Perched Water Proposed Plans and RODs, the agencies believe the alternatives proposed and the decisions made were appropriate. The agencies have no plans to significantly alter the proposed alternatives contained in the Proposed Plan for the Comprehensive TRA OU 2-13 RI/FS.

At the time of the Interim Action ROD for Warm Waste Pond contaminated soils, the agencies knew that containment could be implemented to achieve the cleanup objectives established for that ROD. However, in the spirit of CERCLA and the National Contingency Plan (which has a preference for treatment where reduction of toxicity, mobility, and volume can be achieved), a treatment option was attempted. Because the treatment option was unproven, the first step was to conduct treatability studies to determine whether the treatment would work and how it should be implemented. A contingency remedy of a soil cover was included in the ROD in case the treatment option was not successful.

As the commentor noted, the treatability study demonstrated that some contaminants could be removed from the soil. However, insufficient contaminants could be removed to achieve the cleanup goals. In addition, costs were high, safety issues were increasing, and the volume of secondary wastes generated by the treatment was a concern. Thus, implementing the contingency remedy of a soil cover was deemed to be the best option by the agencies. This was especially true when considering that the contaminants of concern have relatively short decay rates (5 years half-life for cobalt-60 and 33 years half-life for cesium-137). The decision to implement the contingency remedy of emplacing a soil cover after consolidation of contaminated soil into a smaller area was made through an Explanation of Significant Difference to the Interim Action ROD for the Warm Waste Pond, as one of the commentor's noted.

Comments on Budget

50. **Comment:** A couple of commentors questioned the expense of cleanup considering the future land use of the site being questionable and that too much money has been spent to date on the risk assessment and characterization of these sites. (T-I19, W-53)

Response: The purpose of the CERCLA risk assessment is to provide the risk managers from the agencies with the information needed to make decisions regarding remedial action at a site. The risk assessment process has very specific guidance regarding the quantitative analysis of site-specific information necessary to make a determination if contaminants at a site pose an unacceptable or acceptable risk to human health and the environment. The question of whether a site poses an acceptable risk must be answered. The National Contingency Plan defines an acceptable risk range as 1 in 10,000 to 1 in 1,000,000. EPA uses this as a "target range" within which the agency strives to reduce risks as part of a Superfund cleanup.

Cost estimates for the alternatives analyzed were developed for comparison purposes. The actual cost of implementing the selected alternative will vary somewhat during actual design and implementation. The cost estimates described in the Proposed Plan were developed on the basis of a preliminary conceptual design. Many details are not well defined. These details are accounted for within a contingency cost element that is included in each alternative.

51. **Comment:** One commentor was disappointed that DOE had eliminated funding for the Agency for Toxic Substances and Disease Registry (ATSDR) for doing health consultations and stated that funding should be restored to allow health consultations on all RODs. (T-M6)

Response: DOE has just completed an interagency agreement with ATSDR to complete the health assessments required by CERCLA. DOE is providing funding under the agreement so ATSDR can meet its requirements under CERCLA. Health consultations are provided on DOE's request as needed and as determined necessary.

Comments on the TRA Facility Interface

52. **Comment:** Several commentors wanted to know how the schedules for the Materials Test Reactor, the Engineering Test Reactor, the Chemical Leach Pond, the Cold Waste Pond, and continued operations of TRA would impact cleanup. (W-7, W-9, W-17)

Response: During the past 40 years, TRA has provided facilities, utilities, and support capabilities for government and private agencies to conduct experiments associated with the development, testing, and analysis used in nuclear and reactor applications. Because past and present activities associated with TRA facilities and structures are "co-located" with TRA release sites identified in the FFA/CO, an analysis was performed to address the potential for causing current risk to be underestimated (see Appendix D of the OU 2-13 Comprehensive RI/FS). The analysis performed includes a review of past and present operational activities at TRA and associated facilities and structures, and management control procedures to prevent and mitigate releases. All facilities and structures that are operational, that are no longer being used for their original mission, or that are in standby or abandoned mode are included in this analysis. Based on the analysis performed of co-located facilities and activities and management control to prevent releases to the environment, only the Warm Waste Treatment System and the Engineering Test Reactor stack are identified to have the potential to impact comprehensive risk at TRA. The analysis does not identify any structures or facilities that posed an imminent threat of release. However, five-year reviews will evaluate changing conditions that could result in unacceptable risk.

Except for the Brass Cap Area and TRA-19 (which are being addressed by limited action with a contingent excavation and disposal option), it is not anticipated that current operations at TRA will inhibit cleanup operations.

Editorial Comments

53. **Comment:** One commentor suggested changing "and" to "sand" in the last paragraph of page 30 of the Proposed Plan. A commentor noted editorial changes suggesting "North Storage Area including North Storage Area Soil Contamination Area" (page 31, first paragraph) should be set off as a heading or made into a complete sentence. (W-26, W-27)

Response: Comments noted.

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Appendix B

Administrative Record File Index

Appendix B

Administrative Record File Index

This Administrative Record File index is a summary listing of documents arranged according to operable unit within Waste Area Group (WAG) 2, Test Reactor Area (TRA). The following provides the beginning page number for the administrative record for each individual operable unit:

B-1. TRACK 1 INVESTIGATION OF TRA OU 2-01

File Number

AR1.7 INITIAL ASSESSMENTS

Document #: 2859
Title: TRA-02, TRA Paint Shop Ditch
Author: Alexander, T.G.
Recipient: Clark, C.
Date: 09/16/86

AR3.5	TRACK 1 INVESTIGATIONS	
	Document #:	3601
	Title:	TRA 02 Paint Shop Ditch (TRA-606)
	Author:	N/A
	Recipient:	N/A
	Date:	09/13/91

B-2. TRACK 1 INVESTIGATION OF TRA OU 2-02

File Number

AR1.7	INITIAL ASSESSMENTS	
	Document #:	2857
	Title:	TRA-21, TRA Inactive Tank North Side of MTR-643
	Author:	Alexander, T.G.
	Recipient:	Clark, C.
	Date:	10/03/86
	Document #:	2856
	Title:	TRA-22, TRA Inactive Diesel Fuel Tank at ETR-648
	Author:	Alexander, T.G.
	Recipient:	Clark, C.
	Date:	10/03/86
	Document #:	2871
	Title:	TRA-14, TRA Inactive Gasoline Tank at TRA-605
	Author:	Alexander, T.G.
	Recipient:	Clark, C.
	Date:	10/03/86
	Document #:	2873
	Title:	TRA-17, TRA Inactive Gasoline Tank at TRA-616
	Author:	Alexander, T.G.
	Recipient:	Clark, C.
	Date:	10/03/86
	Document #:	2875
	Title:	TRA-18, TRA Inactive Gasoline Tank at TRA-619
	Author:	Alexander, T.G.
	Recipient:	Clark, C.
	Date:	10/03/86

AR3.5 TRACK 1 INVESTIGATIONS

Document #: 5206
Title: TRA 14 TRA Inactive Gasoline Tank at TRA-605
Author: N/A
Recipient: N/A
Date: 10/05/92

Document #: 5287
Title: TRA-22 TRA Diesel Fuel Tank at ETR-648
Author: N/A
Recipient: N/A
Date: 01/06/93

Document #: 5288
Title: TRA-21 TRA Inactive Tank North Side of MTR-643
Author: N/A
Recipient: N/A
Date: 01/06/93

Document #: 5289
Title: TRA-17 TRA Inactive Gasoline Tank at TRA-616
Author: N/A
Recipient: N/A
Date: 01/06/93

Document #: 5290
Title: TRA-18 TRA Inactive Gasoline Tank at TRA-619
Author: N/A
Recipient: N/A
Date: 01/06/93

B-3. TRACK 2 INVESTIGATION OF TRA OU 2-03

File Number

AR1.7 INITIAL ASSESSMENTS

Document #: 2858
Title: TRA-01, TRA Acid Spill Disposal Pit (TRA-608)
Author: Alexander, T.G.
Recipient: Clark, C.
Date: 09/16/86

Document #:	2868
Title:	TRA-11, TRA French Drain at TRA-645
Author:	Alexander, T.G.
Recipient:	Clark, C.
Date:	10/03/86

Document #:	2869
Title:	TRA-12, TRA Fuel Oil Tank Spill (TRA-727B)
Author:	Alexander, T.G.
Recipient:	Clark, C.

Document #:	2879
Title:	TRA-20, TRA Brine Tank (TRA-731) at TRA-631
Author:	Alexander, T.G.
Recipient:	Clark, C.
Date:	10/03/86

Document #:	578
Title:	TRA-40, TRA Tunnel French Drain (TRA-731)
Author:	Pigott, W.R.
Recipient:	Clark, C.
Date:	02/08/89

AR3.14 TRACK 2 SUMMARY REPORT

Document #:	EGG-ER-10736
Title:	Preliminary Scoping Track 2 Summary Report for Operable Unit 2-03
Author:	Sherwood, J.A.
Recipient:	N/A
Date:	08/01/93

AR3.22 TRACK 2 DECISION STATEMENT

Document #:	AM/ERWM-532-93
Title:	Transmittal of the Revised Track 2 Summary Reports for Operable Units 2-03 and 2-06 and the DOE-ID Track 2 Decision Statements
Author:	Lyle, J.L.
Recipient:	Pierre, W.; Nygard, D.
Date:	08/13/93

Document #:	5506
Title:	EPA Recommendation on the Track 2 Summary Report for the Test Reactor Area Operable Unit 2-03
Author:	Meyer, L.
Recipient:	Williams, A.C.
Date:	10/04/94

Document #:	5800
Title:	IDHW Recommendation For OU 2-03 Track 2

Summary Report

Author:	Koch, D.
Recipient:	Williams, A.C.
Date:	10/13/93

Document #:	5855
Title:	Decision Statement for the Track 2 Summary Report for the Operable Unit (OU) 2-03 Test Reactor Area (TRA) including TRA-01, TRA-11, TRA-12, TRA-20, TRA-40, and TRA-614
Author:	DOE, EPA, IDHW
Recipient:	Not Specified
Date:	01/19/95

B-4. TRACK 2 INVESTIGATION OF TRA OU 2-04

File Number

AR1.7 INITIAL ASSESSMENTS

Document #:	2844
Title:	TRA-34, TRA North Storage Area
Author:	Alexander, T.G.
Recipient:	Clark, C.
Date:	07/08/87

Document #:	2866
Title:	TRA-09, TRA Spills at TRA Loading Dock (TRA-722)
Author:	Alexander, T.G.
Recipient:	Clark, C.
Date:	09/11/86

AR3.14 TRACK 2 SUMMARY REPORT

Document #:	EGG-ER-11110
Title:	Preliminary Scoping Track 2 Summary Report for the Test Reactor Area Operable Unit 2-04 Fuel Spills
Author:	Sherwood, J.A.
Recipient:	N/A
Date:	03/01/94

AR3.22 TRACK 2 DECISION STATEMENT

Document #:	OPE-ER-78-94
Title:	Transmittal of the Revised Track 2 Summary Report for Operable Unit 2-04 at the TRA at the INEL and the DOE-ID Decision Statement
Author:	Green, L.
Recipient:	Pierre, W.; Nygard, D.
Date:	04/01/94

Document #:	5790
Title:	IDHW-DEQ Recommendations for OU 2-04 Track 2 Summary Report
Author:	Koch, D.
Recipient:	Green, L.
Date:	11/04/94

Document #:	5513
Title:	EPA Recommendation on the Track 2 Summary Report for Waste Area Group (WAG) 2, Operable Unit (OU) 2-04
Author:	Meyer, L.
Recipient:	Green, L.
Date:	10/11/94

Document #:	5861
Title:	Decision Statement for the Track 2 Summary Report for the Operable Unit (OU) 2-04 Test Reactor Area (TRA) TRA-653, TRA-626, TRA-619, PW-13, TRA-09, TRA-670, and TRA-627
Author:	DOE, EPA, IDHW
Recipient:	Not Specified
Date:	01/19/95

B-5. TRACK 2 INVESTIGATION OF OPERABLE UNIT 2-05

Administrative Record Volume I

File Number

AR1.7 INITIAL ASSESSMENTS

Document #:	2872
Title:	TRA-15, TRA Hot Waste Tanks #2, #3, #4 at TRA-613
Author:	Alexander, T.G.
Recipient:	Clark, C.
Date:	10/16/86
Document #:	2874
Title:	TRA-16, TRA Inactive Radioactive Contaminated Tank at TRA-614
Author:	Alexander, T.G.
Recipient:	Clark, C.
Date:	10/03/86
Document #:	2876
Title:	TRA-19, TRA Rad Tanks 1 & 4 at TRA-630, Replaced by Tanks 1,2,3, & 4
Author:	Alexander, T.G.
Recipient:	Clark, C.
Date:	10/16/86

AR3.1 SAMPLING AND ANALYSIS PLAN

Document #:	EGG-ER-10652, Rev. 1
Title:	Track 2 Sampling and Analysis Plan for the Characterization of Waste Area Group 2, Operable Units TRA 2-05 and 2-07
Author:	Jessmore, J.J.
Recipient:	N/A
Date:	05/01/93

AR3.14 TRACK 2 SUMMARY REPORT

Document #:	EGG-ER-11114
Title:	Preliminary Scoping Track 2 Summary Report for Operable Unit 2-05
Author:	Holdren, K.J.
Recipient:	N/A
Date:	04/01/94

Administrative Record Volume II

File Number

File Number			
AR3.15	HEALTH AND SAFETY PLAN		
		Document #:	EGG-ER-10634, Rev. 2
		Title:	Health and Safety Plan for Track 2 Characterization of Operable Units 2-05 and 2-07 at the Test Reactor Area
		Author:	Rice, R.S.
		Recipient:	N/A
		Date:	06/01/93
AR3.22	TRACK 2 DECISION STATEMENT		
		Document #:	OPE-ER-110-94
		Title:	Transmittal of the Revised Track 2 Summary Report for Operable Unit 2-07 at the Test Reactor Area (TRA) at the INEL
		Author:	Lyle, J.L.
		Recipient:	Pierre, W.; Nygard, W.
		Date:	05/04/94
		Document #:	5789
		Title:	IDHW-DEQ Recommendations for OU 2-05 Track 2 Summary Report
		Author:	Koch, D.
		Recipient:	Green, L.
		Date:	11/04/94
		Document #:	5796
		Title:	EPA Recommendations for Track 2 Summary Report for Waste Area Group 2 Operable Unit 2-05
		Author:	Meyer, L.
		Recipient:	Green, L.
		Date:	10/12/94
		Document #:	5858
		Title:	Decision Statement for the Track 2 Summary Report for the Operable Unit (OU) 2-05 Test Reactor Area (TRA) TRA-16, TRA-15, TRA-19, and TRA-603/605 Tank
		Author:	DOE, EPA, IDHW
		Recipient:	Not Specified
		Date:	01/19/95

B-6. TRACK 2 INVESTIGATION OF OPERABLE UNIT 2-06

File Number

AR1.7 INITIAL ASSESSMENTS

Document #: 2848
Title: TRA-30, TRA Beta Building Rubble Site
Author: Alexander, T.G.
Recipient: Clark, C.
Date: 10/03/86

Document #: 2847
Title: TRA-31, TRA West Rubble Site
Author: Alexander, T.G.
Recipient: Clark, C.
Date: 10/03/86

Document #: 2253
Title: TRA-35, TRA Rubble Site E. of West Road Neat Beta Building Rubble Pile
Author: Alexander, T.G.
Recipient: Clark, C.
Date: 01/11/88

AR3.14 TRACK 2 SUMMARY REPORT

Document #: EGG-ER-10806
Title: Preliminary Scoping Track 2 Summary Report for Operable Unit 2-06
Author: Sherwood, J.A.
Recipient: N/A
Date: 08/01/93

AR3.22 TRACK 2 DECISION STATEMENT

Document #: AM/ERWM-532-93
Title: Transmittal of the Revised Track 2 Summary Reports for Operable Units 2-03 and 2-06 and the DOE-ID Track 2 Decision Statements
Author: Lyle, J.L.
Recipient: Pierre, W.; Nygard, D.
Date: 08/13/93

Document #: 5801
Title: IDHW-DEQ Recommendations for Operable Unit 2-06 Track 2 Summary Report.

Author:	Koch, D.
Recipient:	Williams, A.C.
Date:	10/13/93

Document #:	5802
Title:	EPA Recommendations for the Track 2 Summary Report for the Test Reactor Area Operable Unit 2-06
Author:	Meyer, L.
Recipient:	Williams, A.C.
Date:	10/04/93

Document #:	5856
Title:	Decision Statement for the Track 2 Summary Report for the Operable Unit (OU) 2-06 Test Reactor Area (TRA), TRA-30, TRA-31, and TRA-35
Author:	DOE, EPA, IDHW
Recipient:	Not Specified
Date:	01/19/95

B-7. TRACK 2 INVESTIGATION OF OPERABLE UNIT 2-07

File Number

AR1.7 INITIAL ASSESSMENTS

Document #:	2254
Title:	TRA-36, TRA ETR Cooling Tower Basin (TRA-751)
Author:	Alexander, T.G.
Recipient:	Clark, C.
Date:	01/11/88

Document #:	2239
Title:	TRA-38, TRA ATR Cooling Tower (TRA-771)
Author:	Alexander, T.G.
Recipient:	Clark, C.
Date:	01/12/88

Document #:	2215
Title:	TRA-39, TRA MTR Cooling Tower N of TRA-607
Author:	Alexander, T.G.
Recipient:	Clark, C.
Date:	01/12/88

AR3.1 SAMPLING AND ANALYSIS PLAN

Document #:	EGG-ER-10652, Rev. 1
Title:	Track 2 Sampling and Analysis Plan for the Characterization of Waste Area Group 2, Operable Units TRA 2-05 and 2-07
Author:	Jessmore, J.J.
Recipient:	N/A
Date:	05/01/93

NOTE: This document can be found in Administrative Record Binder Volume I, OU 2-05

AR3.14 TRACK 2 SUMMARY REPORT

Document #:	EGG-ER-11085
Title:	Preliminary Scoping Track 2 Summary Report for Operable Unit 2-07
Author:	Jessmore, P.J.
Recipient:	N/A
Date:	04/01/94

File Number

AR3.15 HEALTH AND SAFETY PLAN

Document #:	EGG-ER-10634, Rev. 2
Title:	Health and Safety Plan for Track 2 Characterization of Operable Units 2-05 and 2-07 at the Test Reactor Area
Author:	Rice, R.S.
Recipient:	N/A
Date:	06/01/93

NOTE: This document can be found in Administrative Record Binder Volume II, OU 2-05

AR3.22 TRACK 2 DECISION STATEMENT

Document #:	OPE-ER-109-94
Title:	Transmittal of the Revised Track 2 Summary Report for Operable Unit 2-07 at the Test Reactor Area (TRA) at the INEL
Author:	Lyle, J.L.
Recipient:	Pierre, W.; Nygard, W.
Date:	05/04/94

Document #:	5788
Title:	IDHW-DEQ Recommendations for OU 2-07 Track 2 Summary Report
Author:	Koch, D.
Recipient:	Green, L.
Date:	11/04/94

Document #:	5797
Title:	EPA Recommendations for Track 2 Summary Report for Waste Area Group 2 Operable Unit 2-05
Author:	Meyer, L.
Recipient:	Green, L.
Date:	10/11/94

Document #:	5857
Title:	Decision Statement for the Track 2 Summary Report for the Operable Unit (OU) 2-07 Test Reactor Area (TRA) ETR Cooling Tower, MTR Cooling Tower, ATR Cooling Tower and TRA-653
Author:	DOE; EPA; IDHW
Recipient:	Not specified
Date:	01/19/95

B-8. TRACK 2 INVESTIGATION OF OPERABLE UNIT 2-08

File Number

AR1.7 INITIAL ASSESSMENTS

Document #:	22 :0
Title:	TRA-37, TRA MTR Canal in Basement of TRA-603
Author:	Alexander, T.G.
Recipient:	Clark, C.
Date:	01/12/88

AR3.14 TRACK 2 SUMMARY REPORT

Document #:	EGG-ER-11113
Title:	Preliminary Scoping Track 2 Summary Report for the Test Reactor Area Operable Unit 2-08
Author:	Blackmore, C.S.
Recipient:	N/A
Date:	03/01/94

AR3.22 DECISION STATEMENT

Document #:	OPE-ER-72-94
Title:	Decision Statement for the Track 2 Summary Report for Operable Unit 2-08
Author:	Lyle, J.L.
Recipient:	Nygard, W.; Pierre, W.
Date:	04/04/94

Document #:	5787
Title:	IDHW-DEQ Recommendations for OU 2-08 Track 2 Summary Report
Author:	Koch, D.
Recipient:	Green, L.
Date:	11/04/94

Document #:	5798
Title:	EPA Recommendations for Track 2 Summary Report For Waste Area Group 2, Operable Unit 2-08
Author:	Meyer, L.
Recipient:	Green, L.
Date:	10/11/94

Document #:	5854
Title:	Decision Statement for the Track 2 Summary Report for the Operable Unit (OU) 2-08 Test Reactor Area (TRA) Materials Test Reactor (MTR) Canal
Author:	DOE, EPA, IDHW
Recipient:	Not Specified
Date:	01/19/95

B-9. TRACK 2 INVESTIGATION OF OPERABLE UNIT 2-09

File Number

AR1.7 INITIAL ASSESSMENTS

Document #:	2864
Title:	TRA-07, TRA Sewage Treatment Plant (TRA-624 & Sludge Pit (TRA-732)
Author:	Alexander, T.G.
Recipient:	Clark, C.
Date:	10/03/86

Document #:	2865
Title:	TRA-08, TRA Cold Waste Disposal Pond (TRA-702)
Author:	Alexander, T.G.
Recipient:	Clark, C.
Date:	09/12/86

Document #:	2870
Title:	TRA-13, TRA Final Sewage Leach Ponds (2) by TRA-732
Author:	Alexander, T.G.
Recipient:	Clark, C.
Date:	10/03/86

AR3.14 TRACK 2 SUMMARY REPORT

Document #:	EGG-ER-10595
Title:	Preliminary Scoping Track 2 Summary Report for Operable Unit 2-09 TRA Sewage Treatment Area and Cold Waste Pond
Author:	Salomon, H.
Recipient:	N/A
Date:	07/01/93

AR3.22 DECISION STATEMENT

Document #:	AM/ERWM-RPO-518-93
Title:	Decision Statement for the Track 2 Summary Report for Operable Unit 2-09
Author:	Lyle, J.L.
Recipient:	Nygard, W.; Pierre, W.
Date:	08/10/93

Document #:	7673
Title:	IDHW-DEQ Recommendations for OU 2-09 Track 2 Summary Report
Author:	Koch, D.
Recipient:	Green, L.
Date:	05/17/94

Document #:	5812
Title:	EPA Recommendations for Track 2 Summary Report For The Test Reactor Area Operable Unit 2-09
Author:	Meyer, L.
Recipient:	Williams, A.C.
Date:	10/04/93

Document #:	5860
Title:	Decision Statement for the Track 2 Summary Report for the Operable Unit (OU) 2-09 Test Reactor Area (TRA) TRA-08 Cold Waste Pond and the TRA Sewage Treatment Area
Author:	DOE, EPA, IDHW
Recipient:	Not Specified
Date:	01/19/95

B-10. TEST REACTOR AREA WARM WASTE POND SEDIMENTS OPERABLE UNIT 2-10

Administrative Record Binder I

File Number

AR1.1 BACKGROUND

Document #:	EPA/540/2-90/001
Title:	Assessment of Technologies for the Remediation of Radioactively Contaminated Superfund Sites
Author:	Environmental Protection Agency
Recipient:	N/A
Date:	01/01/90

Document #:	EPA/540/2-88/002
Title:	Technological Approaches to the Cleanup of Radiologically Contaminated Superfund Sites
Author:	Environmental Protection Agency
Recipient:	N/A
Date:	08/01/88

Document #:	EGG-ER-8644
Title:	Conceptual Model and Description of the Affected Environment for the TRA Warm Waste Pond
Author:	Hull, L.C.
Recipient:	N/A
Date:	10/01/89

AR3.7 INTERIM ACTIONS

Document #:	EGG-WM-9622
Title:	Interim-Action Risk Assessment for the TRA Warm Waste Leach Pond
Author:	Figueroa, I., McClellan, Y., and King, J.J.
Recipient:	N/A
Date:	06/01/91

AR3.10 SCOPE OF WORK

Document #:	2916
Title:	Scope of Work for An Interim Action of the TRA Warm Waste Pond
Author:	Baumer, A.R.
Recipient:	N/A
Date:	03/01/91

AR4.2 FEASIBILITY STUDY REPORTS

Document #:	EGG-WM-10000
Title:	Test Reactor Area Warm Waste Pond at the Idaho National Engineering Laboratory Sediment Treatability Study Phase I Report
Author:	Beller, J.M.
Recipient:	N/A
Date:	11/01/91

AR4.3 PROPOSED PLAN

Document #:	3558
Title:	Proposed Plan for a Cleanup of the Warm Waste Pond Sediments at the TRA at the INEL
Author:	Baumer, A.R.
Recipient:	N/A
Date:	07/01/91

AR5.1 RECORD OF DECISION

Document #:	3320
Title:	Declaration for the Warm Waste Pond at the TRA at the INEL - Declaration of the Record of Decision (ROD)
Author:	Baumer, A.R.
Recipient:	N/A
Date:	12/05/91

Document #:	5253
Title:	Explanation of Significant Difference for the Warm Waste Pond Sediments Record of Decision at the Test Reactor Area, at the INEL
Author:	Jensen, N.R.
Recipient:	N/A
Date:	03/15/93

Document #:	5241
Title:	Technical review Comments for the Draft Treatability Study Report of the Warm Waste Pond Operable Unit 2-10
Author:	Hoveland, R.D.
Recipient:	Jensen, N.R.
Date:	03/08/93

Document #:	5243
Title:	Results of the Pilot Scale Treatability Study for the TRA Warm Waste Pond Vol. I and II
Author:	Meyer, L.
Recipient:	Green, L.A.
Date:	03/08/93

Document #:	5244
Title:	Presentation Slide Copies on the TRA Warm Waste Pond
Author:	Montgomery, R.A.
Recipient:	N/A
Date:	03/08/93

Administrative Record Binder II

Document #:	EGG-ERD-10435
Title:	Test Reactor Area Warm Waste Pond at the Idaho National Engineering Laboratory Pilot-Scale Treatability Study Work Plan
Author:	Montgomery, R.A.
Recipient:	N/A
Date:	09/01/92

Document #:	EGG-ER-10616, Vol. 1
Title:	Results of the Pilot-Scale Treatability Study for the Test Reactor Area Warm Waste Pond
Author:	Montgomery, R.A.
Recipient:	N/A
Date:	04/01/93

Document #:	EGG-ER-10616, Vol. 2
Title:	Results of the Pilot-Scale Treatability Study for the Test Reactor Area Warm Waste Pond
Author:	Montgomery, R.A.
Recipient:	N/A
Date:	04/01/93

Administrative Record Binder III

File Number

AR5.3 EXPLANATION OF SIGNIFICANT DIFFERENCE (continued)

Document #:	910521-N/C
Title:	Warm Waste Pond Bench-Scale Treatability Study
Author:	Nuclear Remediation Technologies Corporation
Recipient:	ASI
Date:	09/01/92

AR7.2 ENDANGERMENT ASSESSMENTS

Document #:	2915
Title:	Rare, Threatened and Endangered Plants and Animals of Idaho
Author:	Moseley, R.
Recipient:	N/A
Date:	03/01/90

AR10.3 PUBLIC NOTICES

Document #:	5255
Title:	Informal Meeting - Explanation of Significant Difference for the Test Reactor Area Warm Waste Pond
Author:	INEL Community Relations
Recipient:	N/A
Date:	03/21/93

AR10.4	PUBLIC MEETING TRANSCRIPTS	
	Document #:	3540
	Title:	Public Meeting Transcripts - Public Comment Meetings Concerning Proposed Cleanup Projects at the Test Reactor Area at the Idaho National Engineering Laboratory
	Author:	N/A
	Recipient:	N/A
	Date:	07/07/91

B-11. TRACK 2 INVESTIGATION OF OPERABLE UNIT 2-11

File Number

AR1.7	INITIAL ASSESSMENTS	
	Document #:	2860
	Title:	TRA-03A, TRA Warm Waste Leach Pond (TRA-758)
	Author:	Alexander, T.G.
	Recipient:	Clark, C.
	Date:	09/12/86
	Document #:	2861
	Title:	TRA-04, TRA Warm Waste Retention Basin (TRA-712)
	Author:	Alexander, T.G.
	Recipient:	Clark, C.
	Date:	09/11/86
	Document #:	2862
	Title:	TRA-05, TRA Waste Disposal Well, Sampling Pit (764) and Sump (703)
	Author:	Alexander, T.G.
	Recipient:	Clark, C.
	Date:	09/11/86
AR3.14	TRACK 2 SUMMARY REPORT	
	Document #:	AM/ERWM-RPO-358-93
	Title:	Transmittal of Revised Track 2 Summary Report for Operable Unit 2-11 at the Test Reactor Area (TRA) at the INEL (DOE-ID Decision Statement incorporated in Track 2 Summary Report)
	Author:	Lyle, J.L.
	Recipient:	Nygard, W.; Pierre, W.
	Date:	03/11/93

Document #:	EGG-ERD-10518
Title:	Scoping Track 2 Summary Report for Operable Unit 2-11 at the Test Reactor Area
Author:	Golder Associates
Recipient:	N/A
Date:	03/01/93

AR3.22 DECISION STATEMENT

Document #:	7051
Title:	IDHW-DEQ Recommendations for OU 2-11 Track 2 Summary Report
Author:	Koch, D.
Recipient:	Green, L.
Date:	08/02/93

Document #:	5811
Title:	EPA Recommendations for Track 2 Summary Report For The Test Reactor Area Operable Unit 2-11
Author:	Meyer, L.
Recipient:	Williams, A.C.
Date:	10/04/93

Document #:	5859
Title:	Decision Statement for the Track 2 Summary Report for the Operable Unit (OU) 2-11 Test Reactor Area (TRA) TRA-03, TRA-04, and TRA-05
Author:	DOE, EPA, IDHW
Recipient:	Not Specified
Date:	01/19/95

B-12. PERCHED WATER SYSTEM RI/FS OPERABLE UNIT 2-12

Administrative Record Volume I

File Number

AR1.1 BACKGROUND

Document #:	EGG-ERD-10313
Title:	Selection Of Groundwater Flow And Contaminant-Transport Models
Author:	Dames and Moore
Recipient:	N/A
Date:	06/01/92

AR3.10 SCOPE OF WORK

Document #:	2377
Title:	Scope of Work Perched Water System RI/FS
Author:	Vernon, D.K.
Recipient:	N/A
Date:	05/23/91

Document #:	ERD-343-91
Title:	Transmittal, Working Schedule for the TRA Perched Water RI/FS
Author:	DOE, Lyle, J.
Recipient:	EPA, Pierre, W. and IDHW, Nygard, D.
Date:	09/12/91

Document #:	3515
Title:	Working Schedule for the TRA Perched Water RI/FS
Author:	DOE, Lyle, J.
Recipient:	EPA, Pierre, W. and IDHW, Nygard, D.
Date:	09/12/91

AR3.4 RI REPORTS

Document #:	EGG-WM-10002
Title:	RI Report for the TRA Perched Water System OU 2-12
Author:	Lewis, S.M.
Recipient:	N/A
Date:	06/01/92

Administrative Record Volume II

File Number

AR3.4 RI REPORTS (continued)

Document #: EGG-WM-10002 (continued)
Appendices A through E

Administrative Record Volume III

Document #: EGG-WM-10002 (continued)
Appendices F through I

Administrative Record Volume IV

AR4.3 PROPOSED PLAN

Document #:	5130
Title:	Dear Citizen Pamphlet on the Proposed Plan for the Perched Water System
Author:	INEL Community Relations
Recipient:	N/A
Date:	06/26/92

AR5.1 RECORD OF DECISION

Document #:	5230
Title:	Record of Decision for the TRA Perched Water System
Author:	INEL Community Relations
Recipient:	N/A
Date:	12/01/92

AR10.3 PUBLIC NOTICES

Document #:	5136
Title:	Attention: Agencies Seek Public Comment on Three Proposed Plans
Author:	INEL Community Relations
Recipient:	N/A
Date:	07/01/92

AR10.4 PUBLIC MEETING TRANSCRIPTS

Document #:	5164-TRA
Title:	Public Meeting Transcripts on the Proposed Plan for the TRA Perched Water System
Author:	N/A
Recipient:	N/A
Date:	07/20/92

B-13. PERCHED WATER SYSTEM RI/FS OPERABLE UNIT 2-13

Administrative Record Volume I

File Number

AR1.1 BACKGROUND

Document #: 10269
Title: Decision Documentation Package for Chemical Waste Pond (TRA-06)
Author: Not specified
Recipient: Not specified
Date: 01/23/92

Document #: EGG-WM-9193
Title: Closure Plan for the Test Reactor Area Chemical Waste Pond (COCA Unit TRA-06)
Author: Burns, S.M.; Stanisich, S.N.; Spry, M.J.; Shoop, D.S.
Recipient: Not specified
Date: 10/01/90

Document #: EG&G-85-17
Title: Unusual Occurrence Report - Facility Number ATR-85-3
Author: Sheldon, D.E.; Boyer, R.D.; Alletzhauser, G.J.; Mousseau, D.R.; Amidei, W.; Hong, J.A.
Recipient: Not specified
Date: 11/13/85

Document #: EG&G-85-41
Title: Unusual Occurrence Report - Facility Number ATR-85-8
Author: Sheldon, D.E.; Boyer, R.D.; Alletzhauser, G.J.; Mousseau, D.R.; Amidei, W.; Hong, J.A.
Recipient: Not specified
Date: 11/13/85

Document #: EGG-ER-10547, Rev. 1
Title: Post Record of Decision Monitoring Plan for the Test Reactor Area Perched Water System Operable Unit 2-12
Author: Not specified
Recipient: Not specified
Date: 09/01/93

AR1.7 INITIAL ASSESSMENTS

Document #:	2863
Title:	TRA-06, WAG 2 Comprehensive RI/FS Including TRA Chemical Waste Pond (TRA-701)
Author:	Alexander, T.G.
Recipient:	Clark, C.
Date:	10/15/86

Administrative Record Volume II

AR3.3 WORK PLAN

Document #:	INEL-94/0026, Revision 0
Title:	Work Plan for Waste Area Group 2 Operable Unit 2-12 Comprehensive Remedial Investigation/Feasibility Study
Author:	Lientz, A.R.; Green, T.S.; Burns, D.E.; Burton, B.N.
Recipient:	N/A
Date:	04/01/95

Administrative Record Volume III

Document #:	OPE-ER-076-95
Title:	Transmittal of Final Remedial Investigation/Feasibility Study Work Plan for the Waste Area Group (WAG) 2 Comprehensive Remedial Investigation/Feasibility Study (RI/FS), Operable Unit (OU) 2-13 at the Idaho National Engineering Laboratory (INEL)
Author:	Jensen, N.R.
Recipient:	Pierre, W.; Nygard, D.
Date:	04/26/95

AR3.4 RI REPORTS

Document #:	OPE-ER-90-96
Title:	Transmittal of Draft Remedial Investigation Report for Waste Area Group (WAG) 2 Comprehensive Remedial Investigation/Feasibility Study (RI/FS), Operable Unit (OU) 2-13 at the Idaho National Engineering Laboratory (INEL)
Author:	Jensen, N.R.
Recipient:	Pierre, W.; Nygard, D.
Date:	05/24/96

File Number

AR3.7

INTERIM ACTIONS

Document #:	02.010.2.1.209.01
Title:	Draft Remedial Action Report Test Reactor Area Warm Waste Pond Interim Action Operable Unit (OU) 2-10
Author:	N/A
Recipient:	Green, L.A.
Date:	06/15/94

AR3.10

SCOPE OF WORK

Document #:	INEL-94/0013
Title:	Scope of Work for Operable Unit 2-13 WAG 2 Comprehensive Remedial Investigation Feasibility Study
Author:	Lientz, A.
Recipient:	N/A
Date:	11/01/94

AR3.12

RI/FS REPORTS

Document #:	OPE-ER-129-96
Title:	Transmittal of Draft Remedial Investigation/Feasibility Study (RI/FS) Report for the Waste Area Group (WAG) 2 Comprehensive Remedial Investigation/Feasibility Study, Operable Unit (OU) 2-13, at the Idaho National Engineering Laboratory (INEL)
Author:	Jensen, N.R.
Recipient:	Pierre, W.; Nygard, D.
Date:	08/22/96

Document #:	OPE-ER-191-96
Title:	Transmittal of Draft Final Remedial Investigation/Feasibility Study (RI/FS) Report for the Waste Area Group (WAG) 2 Comprehensive Remedial Investigation/Feasibility Study, Operable Unit (OU) 2-13, at the Idaho National Engineering Laboratory (INEL)
Author:	Jensen, N.R.
Recipient:	Pierre, W.; Nygard, D.
Date:	12/16/96

Document #:	OPE-ER-10-97
Title:	Transmittal of Final Remedial Investigation/Feasibility Study (RI/FS) Report for the Waste Area Group (WAG) 2 Comprehensive Remedial Investigation/Feasibility Study, Operable Unit (OU) 2-13, at the Idaho National Engineering Laboratory (INEL)
Author:	Jensen, N.R.
Recipient:	Pierre, W.; Nygard, D.
Date:	02/03/97

Document #:	OPE-ER-11-97
Title:	Transmittal of Copies of Final Remedial Investigation/Feasibility Study (RI/FS) Report for the Waste Area Group (WAG) 2 Comprehensive Remedial Investigation/Feasibility Study, Operable Unit (OU) 2-13, at the Idaho National Engineering Laboratory (INEL)
Author:	Jensen, N.R.
Recipient:	Pierre, W.; Nygard, D.
Date:	02/07/97

Administrative Record Volume IV

Document #:	DOE/ID-10531, Rev. 0
Title:	Comprehensive Remedial Investigation/Feasibility Study for the Test Reactor Area Operable Unit 2-13, at the Idaho National Engineering and Environmental Laboratory
Author:	Burns, D.E.; Davis, K.M.; Flynn, S.C.; Keck, J.F.; Hampton, N.L.; Owen, A.H.; VanHorn, R.L.
Recipient:	Not specified
Date:	02/01/97

Administrative Record Volume V

AR3.15 HEALTH AND SAFETY PLAN

Document #:	INEL-94/0002, Rev. 0
Title:	Health and Safety Plan for Test Reactor Area OU 2-13 Comprehensive Remedial Investigation/Feasibility Study at the Idaho National Engineering Laboratory
Author:	Sherwood, J.A.
Recipient:	N/A
Date:	04/01/95

AR4.3 PROPOSED PLAN

Document #:	10408
Title:	Proposed Plan for Waste Area Group 2 - Test Reactor Area Idaho National Engineering and Environmental Laboratory
Author:	INEEL Community Relations
Recipient:	Not specified
Date:	03/01/97

AR10.3 PUBLIC NOTICES

Document #:	10407
Title:	Notice of Availability - Agencies Propose to Remediate Eight Sites at the Test Reactor Area
Author:	INEEL Community Relations
Recipient:	Not specified
Date:	03/09/97

Document #:	10406
Title:	Comment Period Extended March 10 to May 9, 1997 - Agencies Propose to Remediate Eight Sites at the Test Reactor Area
Author:	INEEL Community Relations
Recipient:	Not specified
Date:	03/23/97

Document #:	10405
Title:	Comment Period Extended - Agencies Propose to Remediate Eight Sites at the Test Reactor Area
Author:	INEEL Community Relations
Recipient:	Not specified
Date:	03/24/97

AR11.6 TECHNICAL MEMORANDUM

Document #:	10148
Title:	Post-Record of Decision Monitoring for the Test Reactor Area Perched Water System Operable Unit 2-12, Second Annual Technical Memorandum
Author:	Meyer, L.
Recipient:	Green, L.A.
Date:	09/22/95

Document #: 10149
Title: Post-Record of Decision Monitoring for the Test Reactor Area Perched Water System Operable Unit 2-12, Second Annual Technical Memorandum
Author: Underwood, E.J.
Recipient: Green, L.A.
Date: 10/05/95

Document #: 10304
Title: Post-Record of Decision Monitoring for the Test Reactor Area Perched Water System Operable Unit 2-12, Third Annual Technical Memorandum
Author: Poeton, R.W.
Recipient: Jensen, N.R.
Date: 10/08/96

Document #: 7782
Title: Technical Memorandum Post Record of Decision Monitoring for the Test Reactor Area Perched Water System Operable Unit 2-12
Author: Jessmore, P.J.
Recipient: Not specified
Date: 06/01/94

Document #: INEL-95/0408
Title: Post Record of Decision Monitoring for the Test Reactor Area Perched Water System Operable Unit 2-12 Second Annual Technical Memorandum
Author: Arnett, R.C.; Meachum, T.R.; Jessmore, P.J.
Recipient: Not specified
Date: 08/01/95

Document #: INEL-96/0305
Title: Post Record of Decision Monitoring for the Test Reactor Area Perched Water System Operable Unit 2-12 Third Annual Technical Memorandum
Author: Arnett, R.C.; Meachum, T.R.; Jessmore, P.J.
Recipient: Not specified
Date: 09/01/1996

Document #: 10308
Title: OU 2-12 Third Annual Technical Memorandum and Three-Year Review
Author: Underwood, E.J.
Recipient: Jensen, N.R.
Date: 01/06/1997

Document #:	10005
Title:	The Draft Work Plan for Waste Area Group 2 Operable Unit 2-13 Comprehensive Remedial Investigation/Feasibility Study
Author:	Blood, H.R.
Recipient:	Green, L.A.
Date:	02/10/95

AR12.1 EPA COMMENTS

Document #:	10288
Title:	Comments On Draft Remedial Investigation Report for the Waste Area Group (WAG) 2 Comprehensive Remedial Investigation/Feasibility Study (RI/FS), Operable Unit (OU) 2-13 at the Idaho National Engineering Laboratory (INEL)
Author:	Poeton, R.W.
Recipient:	Green, L.A.
Date:	07/10/96

Document #:	10300
Title:	Comments On Draft Remedial Investigation/Feasibility Study (RI/FS) Report for the Waste Area Group (WAG) 2 Comprehensive Remedial Investigation/Feasibility Study (RI/FS) Operable Unit (OU) 2-13 at the Idaho National Engineering Laboratory (INEL)
Author:	Poeton, R.W.
Recipient:	Jensen, N.R.
Date:	10/09/96

Document #:	10314
Title:	Comments On Draft Proposed Plan for the Waste Area Group (WAG) 2 Comprehensive Remedial Investigation/Feasibility Study (RI/FS), Operable Unit (OU) 2-13, at the Idaho National Engineering Laboratory (INEL)
Author:	Poeton, R.W.
Recipient:	Jensen, N.R.
Date:	01/24/97

Document #: 10397
Title: Comments on: March, 1997 Draft Proposed Plan for the Waste Area Group (WAG) 2 Comprehensive Remedial Investigation/Feasibility Study, Operable Unit (OU) 2-13, at the Idaho National Engineering and Environmental Laboratory (INEEL)
Author: Poeton, R.W.
Recipient: Jensen, N.R.
Date: 02/14/97

AR12.2 IDHW COMMENTS

Document #: 10006
Title: Review Comments on WAG 2 Draft RI/FS Work Plan
Author: Underwood, E.J.
Recipient: Green, L.A.
Date: 02/13/95

Document #: 10289
Title: Review Comments on WAG 2 Draft Comprehensive RI/BRA Report
Author: Underwood, E.J.
Recipient: Green, L.A.
Date: 07/12/96

Document #: 10301
Title: Review Comments on WAG 2 Draft Comprehensive RI/FS Report
Author: Underwood, E.J.
Recipient: Jensen, N.R.
Date: 10/10/96

Document #: 10310
Title: Review Comments on WAG 2 Draft Final Comprehensive RI/FS Report
Author: Underwood, E.J.
Recipient: Jensen, N.R.
Date: 01/02/97

Document #: 10313
Title: Review Comments on WAG 2 Draft Proposed Plan
Author: Underwood, E.J.
Recipient: Jensen, N.R.
Date: 01/27/97

AR12.3 DOE RESPONSE TO COMMENTS

Document #:	OPE-ER-20-97
Title:	DOE Transmittal of Responses to Comments on the Draft Proposed Plan for the Waste Area Group (WAG) 2 Comprehensive Remedial Investigation/Feasibility Study, Operable Unit (OU) 2-13, at the Idaho National Engineering Laboratory (INEL)
Author:	Jensen, N.R.
Recipient:	Pierre, W.; Nygard, D.
Date:	02/26/97

AR12.4 EXTENSIONS AND APPROVALS

Document #:	OPE-ER-169-96
Title:	Twenty Day Extension Notification for Submittal of the Waste Area Group (WAG) 2 Draft Final Comprehensive Remedial Investigation/Feasibility Study (RI/FS), Operable Unit (OU) 2-13 at the Idaho National Engineering Laboratory (INEL)
Author:	Jensen, N.R.
Recipient:	Pierre, W.; Nygard, D.
Date:	11/12/96

Document #:	OPE-ER-01-97
Title:	Fifteen-day Extension for Finalization of the Waste Area Group (WAG) 2 Comprehensive Remedial Investigation/Feasibility Study (RI/FS) Report, Operable Unit (OU) 2-13, at the Idaho National Engineering Laboratory (INEL)
Author:	Jensen, N.R.
Recipient:	Pierre, W.; Nygard, D.
Date:	01/15/97

AR12.5 PROJECT MANAGEMENT MEETING MINUTES

Document #:	5865
Title:	WAG 2 Comprehensive Scoping Meeting Minutes
Author:	IDHW, EPA, DOE, GEOTECH, EG&G Idaho, Inc.
Recipient:	N/A
Date:	08/18/94

File Number

AR1.1

BACKGROUND

Document #:	10269
Title:	Decision Documentation Package for Chemical Waste Pond (TRA-06)
Author:	Not specified
Recipient:	Not specified
Date:	01/23/92

Document #:	EGG-WM-9193
Title:	Closure Plan for the Test Reactor Area Chemical Waste Pond (COCA Unit TRA-06)
Author:	Burns, S.M.; Stanisich, S.N.; Spry, M.J.; Shoop, D.S.
Recipient:	Not specified
Date:	10/01/90

Document #:	EG&G-85-17
Title:	Unusual Occurrence Report - Facility Number ATR-85-3
Author:	Sheldon, D.E.; Boyer, R.D.; Alletzhauser, G.J.; Mousseau, D.R.; Amidei, W.; Hong, J.A.
Recipient:	Not specified
Date:	11/13/85

Document #:	EG&G-85-41
Title:	Unusual Occurrence Report - Facility Number ATR-85-8
Author:	Sheldon, D.E.; Boyer, R.D.; Alletzhauser, G.J.; Mousseau, D.R.; Amidei, W.; Hong, J.A.
Recipient:	Not specified
Date:	11/13/85

Document #:	EGG-ER-10547, Rev. 1
Title:	Post Record of Decision Monitoring Plan for the Test Reactor Area Perched Water System Operable Unit 2-12
Author:	Not specified
Recipient:	Not specified
Date:	09/01/93

AR1.7 INITIAL ASSESSMENTS

Document #:	2863
Title:	TRA-06, WAG 2 Comprehensive RI/FS Including TRA Chemical Waste Pond (TRA-701)
Author:	Alexander, T.G.
Recipient:	Clark, C.
Date:	10/15/86

Administrative Record Volume II

AR3.3 WORK PLAN

Document #:	INEL-94/0026, Revision 0
Title:	Work Plan for Waste Area Group 2 Operable Unit 2-12 Comprehensive Remedial Investigation/Feasibility Study
Author:	Lientz, A.R.; Green, T.S.; Burns, D.E.; Burton, B.N.
Recipient:	N/A
Date:	04/01/95

Administrative Record Volume III

Document #:	OPE-ER-076-95
Title:	Transmittal of Final Remedial Investigation/Feasibility Study Work Plan for the Waste Area Group (WAG) 2 Comprehensive Remedial Investigation/Feasibility Study (RI/FS), Operable Unit (OU) 2-13 at the Idaho National Engineering Laboratory (INEL)
Author:	Jensen, N.R.
Recipient:	Pierre, W.; Nygard, D.
Date:	04/26/95

AR3.4 RI REPORTS

Document #:	OPE-ER-90-96
Title:	Transmittal of Draft Remedial Investigation Report for Waste Area Group (WAG) 2 Comprehensive Remedial Investigation/Feasibility Study (RI/FS), Operable Unit (OU) 2-13 at the Idaho National Engineering Laboratory (INEL)
Author:	Jensen, N.R.
Recipient:	Pierre, W.; Nygard, D.
Date:	05/24/96

AR3.7 INTERIM ACTIONS

Document #:	02.010.2.1.209.01
Title:	Draft Remedial Action Report Test Reactor Area Warm Waste Pond Interim Action Operable Unit (OU) 2-10
Author:	N/A
Recipient:	Green, L.A.
Date:	06/15/94

AR3.10 SCOPE OF WORK

Document #:	INEL-94/0013
Title:	Scope of Work for Operable Unit 2-13 WAG 2 Comprehensive Remedial Investigation Feasibility Study
Author:	Lientz, A.
Recipient:	N/A
Date:	11/01/94

AR3.12 RI/FS REPORTS

Document #:	OPE-ER-129-96
Title:	Transmittal of Draft Remedial Investigation/Feasibility Study (RI/FS) Report for the Waste Area Group (WAG) 2 Comprehensive Remedial Investigation/Feasibility Study, Operable Unit (OU) 2-13, at the Idaho National Engineering Laboratory (INEL)
Author:	Jensen, N.R.
Recipient:	Pierre, W.; Nygard, D.
Date:	08/22/96

Document #:	OPE-ER-191-96
Title:	Transmittal of Draft Final Remedial Investigation/Feasibility Study (RI/FS) Report for the Waste Area Group (WAG) 2 Comprehensive Remedial Investigation/Feasibility Study, Operable Unit (OU) 2-13, at the Idaho National Engineering Laboratory (INEL)
Author:	Jensen, N.R.
Recipient:	Pierre, W.; Nygard, D.
Date:	12/16/96

Document #:	OPE-ER-10-97
Title:	Transmittal of Final Remedial Investigation/Feasibility Study (RI/FS) Report for the Waste Area Group (WAG) 2 Comprehensive Remedial Investigation/Feasibility Study, Operable Unit (OU) 2-13, at the Idaho National Engineering Laboratory (INEL)
Author:	Jensen, N.R.
Recipient:	Pierre, W.; Nygard, D.
Date:	02/03/97

Document #:	OPE-ER-11-97
Title:	Transmittal of Copies of Final Remedial Investigation/Feasibility Study (RI/FS) Report for the Waste Area Group (WAG) 2 Comprehensive Remedial Investigation/Feasibility Study, Operable Unit (OU) 2-13, at the Idaho National Engineering Laboratory (INEL)
Author:	Jensen, N.R.
Recipient:	Pierre, W.; Nygard, D.
Date:	02/07/97

Administrative Record Volume IV

Document #:	DOE/ID-10531, Rev. 0
Title:	Comprehensive Remedial Investigation/Feasibility Study for the Test Reactor Area Operable Unit 2-13, at the Idaho National Engineering and Environmental Laboratory
Author:	Burns, D.E.; Davis, K.M.; Flynn, S.C.; Keck, J.F.; Hampton, N.L.; Owen, A.H.; VanHorn, R.L.
Recipient:	Not specified
Date:	02/01/97

Administrative Record Volume V

AR3.15 HEALTH AND SAFETY PLAN

Document #:	INEL-94/0002, Rev. 0
Title:	Health and Safety Plan for Test Reactor Area OU 2-13 Comprehensive Remedial Investigation/Feasibility Study at the Idaho National Engineering Laboratory
Author:	Sherwood, J.A.
Recipient:	N/A
Date:	04/01/95

AR4.3 PROPOSED PLAN

Document #:	10408
Title:	Proposed Plan for Waste Area Group 2 - Test Reactor Area Idaho National Engineering and Environmental Laboratory
Author:	INEEL Community Relations
Recipient:	Not specified
Date:	03/01/97

AR10.3 PUBLIC NOTICES

Document #:	10407
Title:	Notice of Availability - Agencies Propose to Remediate Eight Sites at the Test Reactor Area
Author:	INEEL Community Relations
Recipient:	Not specified
Date:	03/09/97

Document #:	10406
Title:	Comment Period Extended March 10 to May 9, 1997 - Agencies Propose to Remediate Eight Sites at the Test Reactor Area
Author:	INEEL Community Relations
Recipient:	Not specified
Date:	03/23/97

Document #:	10405
Title:	Comment Period Extended - Agencies Propose to Remediate Eight Sites at the Test Reactor Area
Author:	INEEL Community Relations
Recipient:	Not specified
Date:	03/24/97

AR11.6 TECHNICAL MEMORANDUM

Document #:	10148
Title:	Post-Record of Decision Monitoring for the Test Reactor Area Perched Water System Operable Unit 2-12, Second Annual Technical Memorandum
Author:	Meyer, L.
Recipient:	Green, L.A.
Date:	09/22/95

Document #:	10149
Title:	Post-Record of Decision Monitoring for the Test Reactor Area Perched Water System Operable Unit 2-12, Second Annual Technical Memorandum
Author:	Underwood, E.J.
Recipient:	Green, L.A.
Date:	10/05/95

Document #:	10304
Title:	Post-Record of Decision Monitoring for the Test Reactor Area Perched Water System Operable Unit 2-12, Third Annual Technical Memorandum
Author:	Poeton, R.W.
Recipient:	Jensen, N.R.
Date:	10/08/96

Document #:	7782
Title:	Technical Memorandum Post Record of Decision Monitoring for the Test Reactor Area Perched Water System Operable Unit 2-12
Author:	Jessmore, P.J.
Recipient:	Not specified
Date:	06/01/94

Document #:	INEL-95/0408
Title:	Post Record of Decision Monitoring for the Test Reactor Area Perched Water System Operable Unit 2-12 Second Annual Technical Memorandum
Author:	Arnett, R.C.; Meachum, T.R.; Jessmore, P.J.
Recipient:	Not specified
Date:	08/01/95

Document #:	INEL-96/0305
Title:	Post Record of Decision Monitoring for the Test Reactor Area Perched Water System Operable Unit 2-12 Third Annual Technical Memorandum
Author:	Arnett, R.C.; Meachum, T.R.; Jessmore, P.J.
Recipient:	Not specified
Date:	09/01/1996

Document #:	10308
Title:	OU 2-12 Third Annual Technical Memorandum and Three-Year Review
Author:	Underwood, E.J.
Recipient:	Jensen, N.R.
Date:	01/06/1997

Document #:	10005
Title:	The Draft Work Plan for Waste Area Group 2 Operable Unit 2-13 Comprehensive Remedial Investigation/Feasibility Study
Author:	Blood, H.R.
Recipient:	Green, L.A.
Date:	02/10/95

AR12.1 EPA COMMENTS

Document #:	10288
Title:	Comments On Draft Remedial Investigation Report for the Waste Area Group (WAG) 2 Comprehensive Remedial Investigation/Feasibility Study (RI/FS), Operable Unit (OU) 2-13 at the Idaho National Engineering Laboratory (INEL)
Author:	Poeton, R.W.
Recipient:	Green, L.A.
Date:	07/10/96

Document #:	10300
Title:	Comments On Draft Remedial Investigation/Feasibility Study (RI/FS) Report for the Waste Area Group (WAG) 2 Comprehensive Remedial Investigation/Feasibility Study (RI/FS) Operable Unit (OU) 2-13 at the Idaho National Engineering Laboratory (INEL)
Author:	Poeton, R.W.
Recipient:	Jensen, N.R.
Date:	10/09/96

Document #:	10314
Title:	Comments On Draft Proposed Plan for the Waste Area Group (WAG) 2 Comprehensive Remedial Investigation/Feasibility Study (RI/FS), Operable Unit (OU) 2-13, at the Idaho National Engineering Laboratory (INEL)
Author:	Poeton, R.W.
Recipient:	Jensen, N.R.
Date:	01/24/97

Document #:	10397
Title:	Comments on: March, 1997 Draft Proposed Plan for the Waste Area Group (WAG) 2 Comprehensive Remedial Investigation/Feasibility Study, Operable Unit (OU) 2-13, at the Idaho National Engineering and Environmental Laboratory (INEEL)
Author:	Poeton, R.W.
Recipient:	Jensen, N.R.
Date:	02/14/97

AR12.2

IDHW COMMENTS

Document #:	10006
Title:	Review Comments on WAG 2 Draft RI/FS Work Plan
Author:	Underwood, E.J.
Recipient:	Green, L.A.
Date:	02/13/95

Document #:	10289
Title:	Review Comments on WAG 2 Draft Comprehensive RI/BRA Report
Author:	Underwood, E.J.
Recipient:	Green, L.A.
Date:	07/12/96

Document #:	10301
Title:	Review Comments on WAG 2 Draft Comprehensive RI/FS Report
Author:	Underwood, E.J.
Recipient:	Jensen, N.R.
Date:	10/10/96

Document #:	10310
Title:	Review Comments on WAG 2 Draft Final Comprehensive RI/FS Report
Author:	Underwood, E.J.
Recipient:	Jensen, N.R.
Date:	01/02/97

Document #:	10313
Title:	Review Comments on WAG 2 Draft Proposed Plan
Author:	Underwood, E.J.
Recipient:	Jensen, N.R.
Date:	01/27/97

AR12.3 DOE RESPONSE TO COMMENTS

Document #: OPE-ER-20-97
Title: DOE Transmittal of Responses to Comments on the Draft Proposed Plan for the Waste Area Group (WAG) 2 Comprehensive Remedial Investigation/Feasibility Study, Operable Unit (OU) 2-13, at the Idaho National Engineering Laboratory (INEL)
Author: Jensen, N.R.
Recipient: Pierre, W.; Nygard, D.
Date: 02/26/97

AR12.4 EXTENSIONS AND APPROVALS

Document #: OPE-ER-169-96
Title: Twenty Day Extension Notification for Submittal of the Waste Area Group (WAG) 2 Draft Final Comprehensive Remedial Investigation/Feasibility Study (RI/FS), Operable Unit (OU) 2-13 at the Idaho National Engineering Laboratory (INEL)
Author: Jensen, N.R.
Recipient: Pierre, W.; Nygard, D.
Date: 11/12/96

Document #: OPE-ER-01-97
Title: Fifteen-day Extension for Finalization of the Waste Area Group (WAG) 2 Comprehensive Remedial Investigation/Feasibility Study (RI/FS) Report, Operable Unit (OU) 2-13, at the Idaho National Engineering Laboratory (INEL)
Author: Jensen, N.R.
Recipient: Pierre, W.; Nygard, D.
Date: 01/15/97

AR12.5 PROJECT MANAGEMENT MEETING MINUTES

Document #: 5865
Title: WAG 2 Comprehensive Scoping Meeting Minutes
Author: IDHW, EPA, DOE, GEOTECH, EG&G Idaho, Inc.
Recipient: N/A
Date: 08/18/94

B-14. NO-ACTION SITES FOR THE TEST REACTOR AREA

Administrative Record Binder I

File Number

AR1.6 NO-ACTION SITES

Document #:	3608
Title:	TRA-10 MTR Construction Excavation Pile
Author:	N/A
Recipient:	N/A
Date:	09/13/91
Document #:	3609
Title:	TRA-23 ETR Excavation Site Rubble Pile
Author:	N/A
Recipient:	N/A
Date:	09/13/91
Document #:	3502
Title:	TRA-24 TRA Guardhouse Construction Rubble Pile
Author:	N/A
Recipient:	N/A
Date:	09/13/91
Document #:	3503
Title:	TRA-25 TRA Sewer Plant Settling Pond Rubble Pile
Author:	N/A
Recipient:	N/A
Date:	09/13/91
Document #:	3504
Title:	TRA-26 TRA Rubble Site by USGS Observation Well
Author:	N/A
Recipient:	N/A
Date:	09/13/91
Document #:	3505
Title:	TRA-27 TRA North Storage Area Rubble Pile
Author:	N/A
Recipient:	N/A
Date:	09/13/91

Document #:	3506
Title:	TRA-28 TRA North (Landfill) Rubble Site
Author:	N/A
Recipient:	N/A
Date:	09/13/91

Document #:	3507
Title:	TRA-29 ATR Construction Rubble Pile
Author:	N/A
Recipient:	N/A
Date:	09/13/91

Document #:	3508
Title:	TRA-32 TRA West Road Rubble Pile
Author:	N/A
Recipient:	N/A
Date:	09/13/91

Document #:	3163
Title:	TRA-33 TRA West Staging Area/Drainage Ditch Rubble Pile
Author:	N/A
Recipient:	N/A
Date:	09/13/91

Administrative Record Binder II

AR1.7 INITIAL ASSESSMENTS

Document #:	2867
Title:	TRA-10, MTR Construction Excavation Pile
Author:	Alexander, T.G.
Recipient:	Clark, C.
Date:	10/03/86

Document #:	2855
Title:	TRA-23, ETR Excavation Site Rubble Pile
Author:	Alexander, T.G.
Recipient:	Clark, C.
Date:	10/03/86

Document #:	2854
Title:	TRA-24, TRA Guardhouse Construction Rubble Pile
Author:	Alexander, T.G
Recipient:	Clark, C.
Date:	10/03/86

Document #:	2853
Title:	TRA-25, TRA Sewer Plant Settling Pond Rubble Pile
Author:	N/A
Recipient:	N/A
Date:	10/03/86

Document #:	2852
Title:	TRA-26, TRA Rubble Site by USGS Observation Well
Author:	N/A
Recipient:	N/A
Date:	10/03/86

Document #:	2851
Title:	TRA-27, TRA North Storage Area Rubble Pile
Author:	Alexander, T.G.
Recipient:	Clark, C.
Date:	10/03/86

Document #:	2850
Title:	TRA-28, TRA North Landfill Rubble Site
Author:	Alexander, T.G.
Recipient:	Clark, C.
Date:	10/03/86

Document #:	2849
Title:	TRA-29, TRA ATR Construction Rubble
Author:	Alexander, T.G.
Recipient:	Clark, C.
Date:	10/03/86

Document #:	2846
Title:	TRA-32, TRA West Road Rubble Pile
Author:	Alexander, T.G.
Recipient:	Clark, C.
Date:	10/03/86

Document #:	2845
Title:	TRA-33, TRA West Staging Area/Drainage Ditch Rubble Site
Author:	Alexander, T.G.
Recipient:	Clark, C.
Date:	10/03/86